A SYSTEMATIC REVIEW OF THE GREAT BASIN REPTILES IN THE COLLECTIONS OF BRIGHAM YOUNG UNIVERSITY AND THE UNIVERSITY OF UTAH

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Introduction

This report is one of a planned series of analyses of reptile specimens taken from the Great Basin and now deposited in the major institutional repositories of the western United States. We hope and anticipate that such reports will provide a more adequate systematic and distributional picture of the Great Basin reptile fauna.

At present we are concerned mainly with the species occurring in this region and specimen locality data. If such can be completed we would then perhaps have a nearly complete list of species and subspecies occurring in the basin as well as the distribution limits of each.

The general physical environment and historical aspects of the Great Basin have been treated in recent works by Banta (1963a) and Banta and Tanner (1964). The general physical delimitation of the Great Basin in this account is based largely upon the 1953 edition of the map "Water Resources Development of the United States," by the United States Geological Survey. We have made one correction in southern Nevada and perhaps other minor details should be adjusted. However, we find the map to be useful and generally accurate even in most details. Figure 1 illustrates the physical definition of the Great Basin in addition to the political subdivisions of and within the area as used herein.

The following is a check list of the counties of the states making up the Great Basin. An asterisk (*) preceding a county name indicates that this particular county is located on the border and is thus not located in its entirety within the Great Basin.

California	*Harney	*Washington
*Modoc	*Malheur	*Kane
*Lassen		
*Sierra	Utah	Nevada
*Nevada	*Box Elder	Washoe
*Placer	Cache	Storey
*Eldorado	Rich	Ormsby
*Alpine	Morgan	Douglas
Mono	Weber	Lyon

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Brigham Young University, Provo, Utah and Michigan State University, East Lansing, Michigan.

Inyo
*Kern
*Los Angeles
*San Bernardino

IDAHO
*Cassia
Oneida
Franklin
Bear Lake
*Caribou
*Bannock
*Power

OREGON
*Lake

Davis
Tooele
Salt Lake
*Summit
*Duchesne
*Wasatch
Utah
Juab
Sanpete
*Sevier
Millard
Beaver
Piute
*Wayne
*Garfield
*Iron

*Humboldt
Pershing
Churchill
Mineral
Esmeralda
*Elko
Lander
Eureka
*Nye
*White Pine
*Lincoln
*Clark

WYOMING
*Lincoln
*Uinta

MATERIAL AND METHODS

The Department of Zoology and Entomology collections at Brigham Young University, Provo, Utah, and the University of Utah, Salt Lake City, contain a large number of representative specimens of reptile species inhabiting the Great Basin, especially the eastern Bonneville portion. Recent collections have added measurably to the southern Nevada collections, primarily from the Nevada Atomic Test Site. These collections are at Brigham Young University. It is the purpose of this paper to present analyses of these collections with emphasis on the external morphological variation and geographical distribution of each reptile species.

Basic nomenclature of genera and species is that of Schmidt (1953) with appropriate changes which have since appeared. Species of genera represented by more than one species are organized alphabetically by species name. Distributional records, under the heading *Material Examined*, are listed by state, county, and specific locality. Following each locality, designated by parentheses, is the serial number or numbers of the specific specimen or specimens. Altitudes for some of the localities were determined and are listed in the Checklist of Localities.

Summarized data demonstrating variation of certain morphological characters of the reptiles examined are given under the heading *Variation*. An attempt is made to show the extent of variation in samples examined. All measurements are in millimeters. Discussions of nomenclatural problems are provided when they can be either modified or clarified by this study. Brief discussions of ideas concerning the historical movement of progenitors of existing populations are included under the heading *Remarks*.

We have on several occasions been faced with the perennial question: To which subspecies does this population belong? Because a complete understanding of the basic systematics of all of the species

Figure 1. Delimitation of the Great Basin (dark irregular line) showing the various political subdivisions by county. As shown here the Great Basin encompasses most of the state of Nevada, the western half of Utah, eastern California, southeastern Oregon, southeastern Idaho, and the southwestern corner of Wyoming.

of Great Basin reptile populations has not been completed, we have delayed this report several years while other studies were being completed. There is much remaining to be done on reptiles of the Great Basin; however, we believe that enough information and material is now available to justify the completion of this study. Unfortunately, the samples of many populations are limited and thus it is impossible to adequately demonstrate the range of variation. These, however, will be augmented as other studies are completed.

Abbreviations: The following is a list of abbreviations of words and terms standardized throughout this study:

I. Political Subdivisions

A. States

California - CALIF.; Oregon - ORE.; Idaho - IDA.; Utah - UTAH; Nevada - NEV.; Wyoming - WYO.

B. Counties

Bear Lake - B.L.; San Bernardino - S.B.; Los Angeles - L.A.; White Pine - W.P.; Salt Lake - S.L.

II. Directions

E - east of; S - south of; ENE - east northeast of; SE - southeast of; ESE - east southeast of; SSE - south southeast of; N - north of; SW - southwest of; NE - northeast of; SSW - south southwest of; NNE - north northeast of; W - west of; NW - northwest of; WNW - west northwest of; NNW - north northwest of; WSW - west southwest of.

III. Geographic and Miscellaneous Terms[2]

adj. - adjacent; bdry. - boundary; cn. - canyon; co. - county; cr. - creek; des. - desert; exp. sta. - experiment station; fk. - fork; ft. - fort; gov't. - government; gr. - grove; hd. - head; hwy. - highway; L. - lake; mdw. - meadow; mn. - mine; mth. - mouth; mtn. - mountain, mountain range; N F - national forest; N M - national monument; N P - national park; NTS - Nevada Test Site; nr. near; P G - Proving Ground; pk. - peak; P O - post office; pt. - point; R. - river; rch. - ranch; rd. - road; RR - railroad; R S - ranger station (U.S. Forest Service); sta. - station; tr. - trail; V. - valley; vic. - vicinity of.

Historical Chronology of Collecting Activity

A preliminary account of the history of studies on Great Basin reptiles is that of Banta and Tanner (1964). No attempt will be made to repeat the comments of that work relating to herpetological activities at Brigham Young University (B.Y.U.) and the University of Utah (U. of U.). Certain individuals such as Vasco M. Tanner, D Elden Beck, and Wilmer W. Tanner (B.Y.U.) and A. M. Woodbury, John W. Twente, Jr., and John M. Legler (U. of U.) have been most helpful and have permitted us at various times to use the facilities at these institutions. For these courtesies we are most grateful.

[2]Many of these abbreviations are used in the Checklist of Localities and in the Materials Examined section of each species discussion.

A listing of people active in collecting reptile specimens within the Great Basin for deposition in the collections of Brigham Young University and the University of Utah according to the year or years of their activities, including a listing of the Great Basin country or counties in which samples were made follows:

CHRONOLOGY OF COLLECTING ACTIVITY

YEAR	PERSON	STATE	COUNTY	INSTITUTION
1884	O. Howard	Utah	Tooele	U. of U.
1901	D. Franklin	Utah	Sanpete	U. of U.
1902	F. Coofts & F. Maquoti	Nev.	Washoe	U. of U.
1909	S. E. Aldous	Utah	Cache	U. of U.
1916	H. J. Pack[3]	Utah	S.L.	B.Y.U.
1917	C. J. Jensen	Utah	Weber	U of U.
1920	G. H. Hansen	Utah	Beaver	B.Y.U.
	H. J. Pack	Utah	Cache Iron Tooele	B.Y.U.
1921	H. J. Pack	Utah	S.L.	B.Y.U
1923	H. J. Pack	Utah	Tooele	B.Y.U.
1924	S. E. Aldous	Utah	Sanpete	U. of U.
1925	V. M. Tanner	Utah	Millard Juab	B Y.U.
1926	B. Decker H. Hutchings	Utah	Utah	B.Y.U.
	V. M. Tanner	Utah	Juab Millard Sanpete	B.Y.U.
1927	S. E Aldous	Utah	Tooele	U. of U.
	W. Bailey J. J. Weight	Utah	Utah	U. of U.
	R. V. Chamberlain	Utah	Iron Tooele Utah	U. of U.
	A. C. Jensen	Utah	S.L.	U. of U.
	I. Rasmussen	Utah	Utah	B.Y.U.
	L. Reed	Utah	Millard	U. of U.
	A. M. Woodbury	Utah	Sanpete Tooele Utah	U. of U.
1928	D E. Beck C. J. D. Brown J. Kartchner	Utah	Utah	B.Y.U.

3. H. J. Pack's collection was originally deposited at the Utah State Agricultural College (Utah State University), Logan, Utah. Part of the collection was destroyed or lost owing to lack of curatorial attention. Dr. G. F. Knowlton gave the remainder of the collection to B.Y.U. in 1956.

1928	D. Liddle	Utah	Utah	B.Y.U.
	M. Stevenson			
	M. Stewart			
	W. J. Gertsch	Utah	S.L.	U. of U.
	W. W. Newby			
	A. M. Woodbury			
	A. C. Jensen	Utah	Tooele	U. of U.
	W. Robinson	Utah	Piute	B.Y.U.
	V. M. Tanner	Nev.	Elko	B.Y.U.
			W. P.	
		Utah	Box Elder	B.Y.U.
			Juab	
			Millard	
			Tooele	
1929	W. Ivie	Utah	S.L.	U. of U.
	V. M. Tanner	Utah	Garfield	B.Y.U.
			Millard	
1930	E. W. Fowlks	Utah	Sevier	U. of U.
	F. Gramse			
	V. M. Tanner	Utah	Millard	B.Y.U.
	A. M. Woodbury	Utah	Millard	B.Y.U.
	D. Woodbury			
1931	C. L. Hayward	Utah	Iron	B.Y.U.
1932	W. H. Behle	Utah	Box Elder	U. of U.
	V. Parkinson	Utah	S.L.	U. of U.
	C. Snow			
1933	H. E. Dorst	Utah	Tooele	U. of U.
	P. Klauber	Calif.	S.B.	U. of U.
	V. Parkinson	Utah	S.L.	U. of U.
1936	W. W. Tanner	Utah	Utah	B.Y.U.
	A. M. Woodbury	Utah	Box Elder	U. of U.
			S.L.	
			Tooele	
			Utah	
			Wasatch	
	D. Woodbury &		Tooele	U. of U.
	W. Woodbury			
1937	J. W. Bee	Ida.	B.L.	B.Y.U.
	J. W. Bell	Utah	Utah	B Y.U.
	C. Tanner			
	H. Thomas			
	K. Duke	Utah	Wasatch	B.Y.U.
	S. Flowers	Utah	Juab	U. of U.
	C. L. Hayward	Utah	Utah	B.Y.U.
	M. Marchant	Utah	Summit	B.Y.U.
	V. M. Tanner	Utah	Millard	B.Y.U.
	W W. Tanner	Utah	Utah	B.Y.U.
1938	W. W. Tanner	Utah	Utah	B.Y.U.
	A. M. Woodbury	Utah	S L.	U. of U.

1939	B. Hunt	Utah	Juab	B.Y.U.
	R. Liechty	Utah	Iron	B.Y.U.
	W. W. Newby A. M. Woodbury D. Woodbury	Utah	S.L.	U. of U.
	H. W. Setzer	Utah	Davis S.L. Tooele Utah	U. of U.
	M. H. Chandler	Utah	S.L.	B.Y.U.
1939	V. M. Tanner	Utah	Carbon Sevier	B.Y.U.
	W. W. Tanner	Utah	Utah Cache Sanpete	B.Y.U.
1940	L. Hansen	Utah	Sanpete	B.Y.U.
	D. Beeler W. Woodbury	Utah	Utah	U. of U.
	C. M. Greenhalgh T. A. Woolley	Utah	S.L.	U. of U.
	L. Olson	Utah	Tooele	U. of U.
	H. W. Setzer A. M. Woodbury	Utah	S.L. Tooele Utah	U. of U.
	D. Woodbury	Utah	Tooele Utah	U. of U.
1941	H. Chandler	Utah	Millard	B.Y.U.
	M. M. Snow Crawford V. M. Tanner	Utah	Utah	B.Y.U.
	K. Smith	Utah	Box Elder	B.Y.U.
	W. W. Tanner	Nev. Utah	Elko Millard Tooele	B.Y.U.
1942	S. D. Durrant	Utah	Tooele	U. of U.
	E. Kunzler	Utah	Box Elder	U. of U.
	W. W. Tanner	Utah	Utah	B.Y.U.
1944	G. F. Knowlton	Utah	Beaver	B.Y.U.
	V. M. Tanner	Utah	Utah	B.Y.U.
1945	A. K. Christensen G. Novak V. M. Tanner W. W. Tanner	Utah	Utah	B.Y.U.
1946	A. K. Christensen	Utah	Millard Utah	B.Y.U.
1947	A. K. Christensen	Utah	Beaver	B.Y.U.
	L. S. Miller	Utah	Utah	B.Y.U.
	A. M. Woodbury	Utah	S.L.	U. of U.
1948	D. M. Allred	Utah	Millard	B.Y.U.

	W. W. Tanner	Utah	Utah	B.Y.U.
1949	D. M. Allred	Utah	Millard	B.Y.U.
	C. Berdall			
	D. B. Skousen			
	L. Heyrand	Utah	Tooele	U. of U.
	S. Smith			
	C. W. Lockerbie	Utah	Juab	U. of U.
	D. D. Parker	Utah	Juab	B.Y.U.
			Millard	
			Tooele	
	V. M. Tanner	Utah	Juab	B.Y.U.
			Millard	
	W. W. Tanner	Utah	Utah	B.Y.U.
1950	E. Averill	Utah	S.L.	U. of U.
	G. S. Bigler			
	L. E. Bitner			
	N. R. Christensen			
	C. D. Johnson			
	G. N. Taylor			
	W. Woodbury			
	D E. Beck	Utah	Beaver	B.Y.U.
			Juab	
			Millard	
	H. Goldschmidt	Calif.	S.B.	B.Y.U.
	R. Hansen	Utah	Tooele	U. of U.
	F. Jensen			
	A. C. Winslow			
	R. Liechty	Utah	Beaver	B.Y.U.
	J. L. Munyon	Utah	Juab	B.Y.U.
	V. M. Tanner	Nev.	Nye	B.Y.U.
			W.P.	
		Utah	Beaver	
			Millard	
			Tooele	
			Utah	
	W. W. Tanner	Nev.	W.P.	B.Y.U.
		Utah	Juab	
			Utah	
1951	D E. Beck	Utah	Juab	B.Y.U.
	V. M Tanner	Nev.	Nye	B Y.U.
		Utah	Millard	
1952	D E. Beck	Utah	Sanpete	B.Y.U.
	M. Coffee	Utah	Sevier	B.Y U.
	M. Killpack	Utah	Millard	B.Y.U.
	A. H. Kopp	Utah	Utah	B.Y.U.
	W W. Tanner	Utah	Iron	B.Y.U.
1953	D E. Beck	Utah	Millard	B.Y.U.
			Iron	
			Juab	

1953	J. F. Howell	Utah	Utah	B.Y.U.
	M. Killpack	Utah	Rich	B.Y.U.
	G. F. Knowlton	Utah	Tooele	B.Y.U.
1954	D. Bringhurst	Utah	Utah	B.Y.U.
	G. Tregaskis			
	J. F. Howell	Utah	Juab	B.Y.U.
	R. D. Sperry	Utah	Sevier	B.Y.U.
			Utah	
	L. A. Swanson	Utah	Sevier	B.Y.U.
	W. W. Tanner			
1955	K. Bacon	Utah	Millard	B.Y.U.
	D. C. Chester	Utah	Sevier	B.Y.U.
	D. H. Curtis			
	D. Mumford			
	R. Pursely			
	L. Stevens			
	C. Taylor			
	V. J. Cox	Utah	Tooele	B.Y.U.
	D. Hansen	Utah	Beaver	B.Y.U.
			Utah	
	W. W. Tanner	Utah	Beaver	B.Y.U.
			Sevier	
			Utah	
1956	R. B. Loomis	Calif.	L.A.	B.Y.U.
	W. W. Tanner	Utah	Utah	B.Y.U.
	R. Taylor			
	W. G. Robison	Utah	Tooele	B.Y.U.
	D. D. Parker	Utah	Utah	B.Y.U.
1957	J. Smith	Utah	Summit	U. of U.
	W. W. Tanner	Utah	Utah	B.Y.U.
	J. W. Twente	Utah	Box Elder	U. of U.
			Sevier	
			Tooele	
1958	J. C. Bowman	Utah	Utah	B.Y.U.
	S. G. Hansen	Nev.	Nye	B.Y.U.
	W. G. Robison	Utah	Utah	B.Y.U.
	W. W. Tanner	Utah	Utah	B.Y.U.
	D. D. LaMare	Utah	Utah	B.Y.U.
1959	D. M. Allred	Nev.	Nye	B.Y.U.
	D E. Beck			
	W. W. Tanner	Utah	Millard	B.Y.U.
	A. Hansen	Utah	Sanpete	B.Y.U.
1960	D E. Beck	Utah	Juab	B.Y.U.
	W. W. Tanner	Nev.	Churchill	B.Y.U.
		Utah	S.L.	B.Y.U.
	J. Harmon	Utah	Sanpete	B.Y.U.
	J. E. Kuda	Utah	Utah	B.Y.U.
1961	D E. Beck	Calif.	Inyo	B.Y.U.
	D. M. Allred	Nev.	Nye	B.Y.U.

1961	D E. Beck C. D. Jorgensen W. W. Tanner	Nev.	Nye	B.Y.U.
1962	D. M. Allred D E. Beck C. D. Jorgensen W. W. Tanner	Nev.	Nye	B.Y.U.
1963	C. D. Jorgensen J. R. Lannon	Nev.	Nye	B.Y.U.

Localities

Great Basin localities represented by reptile specimens in the collections of Brigham Young University and the University of Utah are listed below. Altitudes were determined when possible. An asterisk (*) before the elevation on the accompanying list indicates that the elevation is of the nearest town and not the exact locality represented by the specimen sample. The following were used in the determination of geographic data for this list: Davis (1939), Durrant (1952), Federal Writers Project (1950), Gannett (1900, 1906), Hubbs and Miller (1948), and Woodbury (1952).

ALPHABETICAL INDEX OF LOCALITIES REPRESENTED BY REPTILE SPECIMENS IN THE COLLECTIONS OF BRIGHAM YOUNG UNIVERSITY AND UNIVERSITY OF UTAH

State	*County*	*Specific locality*	*Elevation*
Calif.	Inyo	Oasis	
Calif.	Inyo	Panamint Sphrs., E	
Calif.	L.A.	Llano, 3 mi E	3169
Calif.	L.A.	Littlerock, 2 mi E	2910
Calif.	L.A.	Palmdale	2664
Calif.	S.B.	Cajon Pass	4011
Calif.	S.B.	Baker	920
Ida.	Bannock	Jump Cr.	
Ida.	Bannock	Lava Hot Sprs.	
Ida.	Bannock	Swan L.	
Ida.	B. L.	Deep L.	
Ida.	B. L.	Paris	
Ida.	Cassia	Birch Cr.	
Ida.	Cassia	Oakley	
Ida.	Cassia	Shoshone Falls	
Ida.	Franklin	Clifton	
Ida.	Franklin	Clifton Cr.	
Ida.	Franklin	Preston	
Nev.	Churchill	90 mi E Fallon	
Nev.	Elko	Lyman Sprs.	
Nev.	Elko	Wells, 20 mi E	5525*
Nev.	Humboldt	Winnemucca, 28 mi. E	4324*[4]
Nev.	Lander	Battle Mountain	4507

4 An asterisk (*) after the elevation indicates that the elevation is of the nearest town and not of the exact locality.

Nev.	Lyon	Fernley	
Nev.	Nye	Cherry Cr.	
Nev.	Nye	Currant, 35 mi SW	
Nev.	Nye	Locke's	
Nev.	Nye	Nuclear Test Site, Mercury	
Nev.	Nye	Sunnyside	
Nev.	Nye	Sunnyside, 19 mi S	
Nev.	Washoe	Pyramid L.	
Nev.	Washoe	Wadsworth	
Nev.	W. P.	Big Spr.	
Nev.	W. P.	Hot Cr. Spr.	
Nev.	W. P.	Lehman Cave NM	
Nev.	W. P.	Lund, & 1 mi E	
Nev.	W. P.	Mt. Wheeler	
Nev.	W. P.	Preston	
Nev.	W. P.	Sacramento Pass	7154
Nev.	W. P.	Saw Mill Cn.	
Utah	Beaver	Beaver	5970
Utah	Beaver	Beaver, 12.3 mi W	5970*
Utah	Beaver	Milford	4958
Utah	Beaver	Milford V., between Milford & Minersville	
Utah	Beaver	Minersville	5625
Utah	Beaver	Minersville Dam	5625*
Utah	Beaver	Sulphurdale	5625
Utah	Beaver	Wah Wah Spr.	
Utah	Beaver	W portion of county	
Utah	Beaver	Wildcat, 10 mi S Cove Ft.	
Utah	Box Elder	Bear R.	4215
Utah	Box Elder	Bird Id.	
Utah	Box Elder	Blue Ridge Mtns.	
Utah	Box Elder	Brigham	4307
Utah	Box Elder	Chesapeake Gun Club	4215
Utah	Box Elder	Como Spr.	
Utah	Box Elder	Corrine, 6 mi W & 12 mi N	4229*
Utah	Box Elder	Dolphin Id.	
Utah	Box Elder	Grouse Cr. Mtns., Rosebud Cr.	
Utah	Box Elder	Hansel V.	4200-5000
Utah	Box Elder	Locomotive Spr.	4400
Utah	Box Elder	Patterson Pass	
Utah	Box Elder	Raft R. Mtns., Roseverse Cr.	
Utah	Box Elder	Saline, 5 mi E	4217*
Utah	Box Elder	Snowville	4544
Utah	Box Elder	Tacoma Mtns., Lucin	4475
Utah	Box Elder	Tremonton	4315
Utah	Cache	Dry L.	5600
Utah	Cache	Logan	4535
Utah	Cache	Logan Cn.	
Utah	Cache	Smithfield	4450
Utah	Cache	Tony Cr.	
Utah	Cache	Wellsville	5000
Utah	Cache	Wellsville Cn.	
Utah	Davis	Bountiful	4398
Utah	Davis	Bountiful, cn. E	
Utah	Davis	Clearfield	4487
Utah	Davis	Farmington	4200
Utah	Davis	Farmington Bay	
Utah	Davis	Kaysville	4344
Utah	Davis	Phillips Oil Refinery	4253
Utah	Davis	Ward Cn.	

Utah	Davis	Woods Cross	4292
Utah	Garfield	Bryce Cn. NP	
Utah	Garfield	Panguitch	
Utah	Iron	Cedar Brakes NM	
Utah	Iron	Cedar City	5834
Utah	Iron	Cedar City Cn.	
Utah	Iron	Iron City	
Utah	Iron	Ironton Ruins	
Utah	Iron	Kanarraville	5541
Utah	Iron	Lund	5082
Utah	Iron	Newcastle, ±4 mi S	
Utah	Iron	Parowan, 10 mi W	5990*
Utah	Iron	Summit on rd. between Paragonah & Parquitah	
Utah	Juab	Birch Cr. Cn.	5500
Utah	Juab	Callao	4341
Utah	Juab	Callao, 10 mi SE	
Utah	Juab	Callao, 15 mi S	
Utah	Juab	Cherry Cr.	
Utah	Juab	Deep Cr. Mtns., Thomas Cr.	
Utah	Juab	Delta, 30 mi N	
Utah	Juab	Fish Spr.	5000
Utah	Juab	Fish Spr., 8 mi S	
Utah	Juab	Gandy Spr.	
Utah	Juab	Jericho	5309
Utah	Juab	Jericho, 3 mi N	
Utah	Juab	Levan	5163
Utah	Juab	Levan, 4 mi S	
Utah	Juab	Lynndyl, 10 mi N	4784*
Utah	Juab	Mammoth	6026
Utah	Juab	Nephi	5114
Utah	Juab	Salt Cr. Cn.	
Utah	Juab	Silver City, 2 mi S	6100*
Utah	Juab	Topaz Mtn., nr. Lynndyl	7110
Utah	Juab	Trout Cr.	4675
Utah	Juab	Yuba Dam	
Utah	Millard	Antelope Mtns., Antelope Spr.	6743
Utah	Millard	Black Rock	4852
Utah	Millard	Clear L.	4750
Utah	Millard	Cove Ft.	6000
Utah	Millard	Cove Ft., 3 mi N	
Utah	Millard	Cove Ft., 10 mi N	4649
Utah	Millard	Delta, 10 mi NW	
Utah	Millard	Delta	
Utah	Millard	Delta, 50 mi SW	
Utah	Millard	Deseret	4586
Utah	Millard	Desert Range Exp. Sta.	
Utah	Millard	Fillmore	5135
Utah	Millard	Fillmore Cn.	
Utah	Millard	Fillmore, craters w	
Utah	Millard	Fillmore, 15 mi NW (Devil's Kitchen)	
Utah	Millard	Gandy	5050
Utah	Millard	Hinckley, 15 mi S	
Utah	Millard	Horse Range, Margum Pass	6400
Utah	Millard	Iber	
Utah	Millard	Leamington, 7 mi N	4728*
Utah	Millard	Lynndyl	4785
Utah	Millard	Lynndyl, 6 mi N	
Utah	Millard	Notch Mtn., US Hwy 6	
Utah	Millard	Oak City	4700
Utah	Millard	Oak City, 2 mi W	

Utah	Millard	Oak City, 5 mi SW	
Utah	Millard	Oak Cr.	
Utah	Millard	White V.	4600-4900
Utah	Morgan	Como Spr.	
Utah	Morgan	Como Spr., E of	
Utah	Morgan	Morgan	5068
Utah	Piute	Black Cn.	
Utah	Piute	Circleville	
Utah	Piute	Kingston	
Utah	Piute	Marysvale	4125
Utah	Rich	Bear L.	5925
Utah	Rich	Woodruff Cr., W fk.	6344*
Utah	Rich	Woodruff Cr., N fk.	
Utah	S. L.	Alta	8585
Utah	S. L.	Antelope Id., 5 mi S	4203
Utah	S. L.	Brighton	8730
Utah	S. L.	City Cr. Cn.	
Utah	S. L.	Draper, 5 mi NE	4505
Utah	S. L.	Dry Cn.	
Utah	S. L.	Emigration Cn.	
Utah	S. L.	Ft. Douglas	
Utah	S. L.	Little Cottonwood Cn.	5200-9800
Utah	S. L.	Mill Cr. Cn.	4337
Utah	S. L.	Murray	
Utah	S. L.	Parley's Cn.	
Utah	S. L.	S. L. City	4253
Utah	S. L.	Sandy	4451
Utah	S. L.	Sandy, W & SE	
Utah	S. L.	Warm Spr.	
Utah	S. L.	White Pine L.	
Utah	Sanpete	Ephraim	5514
Utah	Sanpete	Ephraim, 2 mi NE	
Utah	Sanpete	Fairview	6023
Utah	Sanpete	Fountain Green	6026
Utah	Sanpete	Fountain Green, 3 mi N	
Utah	Sanpete	Gunnison, reservoir E	5750*
Utah	Sanpete	Indianola	5685
Utah	Sanpete	Manti	5552
Utah	Sanpete	Maple Cn.	4846-5750
Utah	Sanpete	Mayfield, 5 mi S	
Utah	Sanpete	Mt. Pleasant	
Utah	Sanpete	Spring City	5685
Utah	Sevier	Annabella	5250
Utah	Sevier	Aspene	
Utah	Sevier	Fish L.	8750
Utah	Sevier	Marysvale Cn.	5500-5800
Utah	Sevier	Richfield	5340
Utah	Sevier	Salina Cn.	5200-6500
Utah	Sevier	Sevier Cn.	6550-7000
Utah	Sevier	Sigurd	5220
Utah	Sevier	Sigurd, 8-9 mi SE & 9 mi E	
Utah	Sevier	Jct. Sigurd-Richfield rds. on way to Loa	
Utah	Summit	Coalville, 1½ mi NE	5572
Utah	Summit	Peoa	6191
Utah	Summit	Woodland	6806
Utah	Tooele	Benmore	5700
Utah	Tooele	Bunkhill Mine	
Utah	Tooele	Cedar Mtns.	

Utah	Tooele	Clover	5180
Utah	Tooele	Desert Mtns., 15 mi N Wendover	
Utah	Tooele	Dugway P Co's entrance	
Utah	Tooele	Dugway P Co	
Utah	Tooele	Fish Spr.	
Utah	Tooele	Gold Hill	
Utah	Tooele	Grantsville, W of	
Utah	Tooele	Grantsville, 4 mi N & 4 mi W	4304*
Utah	Tooele	Ibapah	5288
Utah	Tooele	Ibapah, 15 mi N	
Utah	Tooele	Indian Spr.	5284
Utah	Tooele	Knolls	4253
Utah	Tooele	Low	4604
Utah	Tooele	Menile	
Utah	Tooele	New Stansbury Id.	4202
Utah	Tooele	Ophir, 3 mi W	6498
Utah	Tooele	Between Ophir & Mercur	
Utah	Tooele	Rush Valley	5000-5500
Utah	Tooele	Salt Spr.	4350
Utah	Tooele	Skull Valley	4250-4750
Utah	Tooele	Skull Valley, N end	
Utah	Tooele	Stansbury Mtns., E Dugway entrance	
Utah	Tooele	Stockton	5069
Utah	Tooele	Stockton, 3 mi SE	
Utah	Tooele	Tooele V.	4250-4500
Utah	Tooele	Vernon, Lookout Pass	5511*
Utah	Tooele	Wendover, 2 mi NW & 3 mi E	4246*
Utah	Tooele	Willow Spr.	
Utah	Tooele	Willow Spr., 3 mi W	
Utah	Utah	Altamount	4566
Utah	Utah	Alpine	4957
Utah	Utah	American Fk.	
Utah	Utah	American Fk. Cn.	
Utah	Utah	Benjamin	4546
Utah	Utah	Carterville	
Utah	Utah	Cedar Ft.	5250
Utah	Utah	Cedar Ft., 2 mi S	
Utah	Utah	Cedar V.	
Utah	Utah	Cedar V., W side	
Utah	Utah	Chimney Rock Pass	4500-5000
Utah	Utah	Diamond Fk. Cn.	
Utah	Utah	Dividend	6250
Utah	Utah	Elberta	4664
Utah	Utah	Elberta, 2 mi W	
Utah	Utah	Elberta, 3 mi N (Meseda Bend)	
Utah	Utah	Fairfield	4876
Utah	Utah	Goshen	4531
Utah	Utah	Goshen, 6 mi N	
Utah	Utah	Grove Cr.	
Utah	Utah	Hobble Cr. Cn.	
Utah	Utah	Homansville	6232
Utah	Utah	Lake Mtns., Eureka	
Utah	Utah	Lake Mtns., Tintic	6750
Utah	Utah	Lake Mtn., Utah L.	
Utah	Utah	Lehi	4562
Utah	Utah	Lehi, foothills N	
Utah	Utah	Lehi, 5 mi W	
Utah	Utah	Lehi, 10 mi W	
Utah	Utah	Mercur (canyon above)	
Utah	Utah	Mt. Timpanogos, Aspen Grove	6800

Utah	Utah	Nebo Cn.	
Utah	Utah	Oquirrh Mtns., West Cn.	
Utah	Utah	Orem	4760
Utah	Utah	Payson	4605
Utah	Utah	Pleasant Grove	4557
Utah	Utah	Pleasant Grove Cn.	4557-4750
Utah	Utah	Pole Cn.	
Utah	Utah	Provo	4553
Utah	Utah	Provo Cn.	
Utah	Utah	Richmond, 9 mi S	
Utah	Utah	Rock Cn.	
Utah	Utah	Santaquin, W	4761
Utah	Utah	Saratoga, 5 mi W	
Utah	Utah	Spanish Fk.	4750
Utah	Utah	Spanish Fk. Cn.	4750-5000
Utah	Utah	Springville	4600
Utah	Utah	Sunshine Cn.	
Utah	Utah	Thistle	5052
Utah	Utah	Thistle, 3 mi E	
Utah	Utah	Thistle, 9 mi S	
Utah	Utah	Thistle Cn.	
Utah	Utah	Timpanogos Cave Trail	4750-7750
Utah	Utah	Utah L., W	4489
Utah	Utah	Utah L., Pelican Pt.	
Utah	Utah	Utah L., Powell's Slough	
Utah	Utah	Utah L., Provo Bay	
Utah	Utah	West Cn. (cabins)	
Utah	Utah	West Cn. S Fk.	
Utah	Wasatch	Charleston	5433
Utah	Wasatch	Lake Cr. Cn.	6250*
Utah	Wasatch	Wallsburg	5300
Utah	Washington	Blue Sprs.	
Utah	Washington	Pinto	
Utah	Weber	Farr West	4244
Utah	Weber	Ogden	
Utah	Weber	Ogden Cr.	4288-4815

Species Account

Sauria

Family Eublepharidae

Genus *Coleonyx* Gray

Coleonyx variegatus utahensis Klauber

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17926-9, 17931, 17987, 18812).

Variation—Females attain a larger snout-vent length than males [♀ 12 (61.6) 44-70; ♂ 16 (54.13) 37-66].[5] Males, of course, possess developed anal pores [♂ 16 (5.87) 4-8], whereas these structures are not developed to be detectible in females. In our sample there are more postmentals in males than in females [♂ 16 (5.75) 3-7; ♀ 12 (5.5) 3-8].

The dorsal color pattern is variable with most specimens having a pattern similar to specimens from the type locality (St. George,

5. Number (mean) range. This sequence will be used throughout.

Utah). However, some are similar to or show indications of intergradation with *v. variegatus.*

Remarks—Tanner and Jorgensen (1963) extend the range of the Utah subspecies into southern Nye County, Nevada, and suggest that intergradation should be expected in western Nye County or in adjoining California. Inasmuch as these subspecies are largely determined by color pattern, and since the geographical and habitat of this area is rather uniform, it is expected that the area of intergradation may be wider than has been indicated in previous studies of Klauber (1945).

Family Iguanidae

Genus *Dipsosaurus* Hallowell

Dipsosaurus dorsalis dorsalis Hallowell

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17943, 18813-4).

Variation—The above three specimens are females. The snout-vent lengths ranged from 97 to 122 with a mean of 110. Femoral pore counts ranged from 39 to 42 with a mean of 40.66. Ventrals, counted medially, ranged from 89 to 99 with a mean of 93.66. Dorsals ranged from 87 to 95 with a mean of 89. Two of the specimens have regenerated tails.

Remarks—The Northern Crested Lizard does not enter the Great Basin in Utah and in Nevada reaches only the extreme southeastern edge of the basin in Nye County.

We concur with Stebbins (1954) that this lizard is usually found in areas where the creosote bush is a part of the desert community. However, the altitude of 3,200 feet reported for the Providence Mountains should not be considered as the maximum altitude for this species in Nevada. On the basis of the sight record from Cane Springs (NTS) we believe that this species ranges from the flats up to at least 3,500 feet, on the western slopes of the Frenchman Flat basin.

Genus *Crotaphytus* Holbrook

Crotaphytus collaris baileyi Stejneger

Material Examined—Calif.: Inyo Co., E Panamint Sprs. (B.Y.U. 18055).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17275, 17940-2, 18815-6, plus nine uncatalogued specimens).

Utah: Tooele Co., Gold Hill (B.Y.U. 4305-6, U. of U. 39), New Stansbury Id. (U. of U. 491), Low (U. of U. 931-2), Wendover, 3 mi E (U. of U. 33554, 33596), Desert Mtns. 15 mi N, 13 mi E Wendover (U. of U. 3274), Dugway PG (B.Y.U. 14818, 14822, 14854, U. of U. 3388, 3391-3). Utah Co., Lake Mtns. (B.Y.U. 552, 1628, 1630-2), Santaquin (U. of U. 2038), Chimney Rock Pass (B.Y.U. 2844, 14689), Cedar V. (B.Y.U. 450, 1466, 1460, 1455).

Juab Co., Trout Cr. (U. of U. 1214-5). Topaz Mtn. (B.Y.U. 9069). Millard Co., Desert Range Exp. Sta. (U. of U. 2802), Fillmore (B.Y.U. 8753, 8755, 4309, 12946), Antelope Sprs. (B.Y.U. 449, 1447), 15 mi S Hinckley (B.Y.U. 4310), Oak City (B.Y.U. 447), Deseret (B.Y.U. 448), Cowboy Pass, 6 mi W Delta (B.Y.U. 21703), 10 mi NW Delta (B.Y.U. 8883), Lynndyl (B.Y.U. 445). Beaver Co., W portion (B.Y.U. 12715-6).

Variation—Males attain a greater snout-vent length than females in the samples examined [♂ 22 (89.4) 49-104; ♀ 21 (79.52) 50-92]. Females seem to have a slightly larger number of dorsal scales [♂ 22 (164.2) 140-179; ♀ 21 (166) 157-175]. There is very little sexual dimorphism exhibited by femoral pore counts [♂ 21 (33.9) 29-39; ♀ 21 (34) 30-38].

Remarks—The fact that populations of *C. collaris* have a much more extensive distribution than *C. wislizeni* outside of the Great Basin suggests that *collaris* is the older of the two species. Populations of *C. collaris* extend farther east onto the western prairie areas at the present time. They occur in areas which receive more precipitation than do any of the Great Basin valleys or foothills at the present time. This would tend to suggest that populations of *collaris* may have survived in the most moist situations of the Pluvial Periods in the Great Basin.

Crotaphytus wislizenii Baird and Girard

Material Examined—Nev.: Lander Co., Battle Mtn. (B.Y.U. 2918). Nye Co., NTS, Mercury (B.Y.U. 17276-9, 17308-22, 17944, 18969, 18984, 21740-21755). Washoe Co., Pyramid L. (U. of U. 1672). W. P. Co., Lehman Caves NM (B.Y.U. 558.

Utah: Tooele Co., Stansbury Mtns. (B.Y.U. 14688), Willow Sprs. (U. of U. 3562), Cedar Ridge (U. of U. 315), 2 mi NW Wendover (U. of U. 33599), Skull V. (U. of U. 51, 843a-g, 843i, 1221a, 1222a, 1223a, 33598), Cedar Mtns. (U. of U. 364, 644), 15 mi N Ibapah (B.Y.U. 480, 1555), Dugway PG (B.Y.U. 14843-14853). S. L. Co., Sandy (U. of U. 18). Utah Co., 6 mi N Goshen (B.Y.U. 576, 2210-1, 8496, 12196, 14690-1), Goshen (B.Y.U. 483, 1633, 2019-2021), W side Utah L. (U. of U. 1-4, 2a, 3563-7), Elberta (B.Y.U. 21506). Juab Co., 10 mi N Lynndyl (B.Y.U. 2731, 3020, 3027), Trout Cr. (B.Y.U. 11296, 1216), 3 mi N Jericho (B.Y.U. 10244, 12496), Fish Spr. (B.Y.U. 11295). Millard Co., Desert Range Exp. Sta. (U. of U. 2803-4, B.Y.U. 580, 4302, 11349), 5 mi SW Oak City (B.Y.U. 11354), 2 mi W Oak City (U. of U. 3298-3301), 10 mi N Cove Ft. (B.Y.U. 481), Devil's Kitchen (B.Y.U. 9099). Beaver Co., Minersville Dam (B.Y.U. 12001-2). Iron Co., Cedar City (B.Y.U. 478), Ironton ruins (U. of U. 1659), Lund (B.Y.U. 2371, 2374, 2376-7, 2899).

Variation—In contrast to *C. collaris baileyi*, female *C. wislizeni* attain a longer mean size than do males (42 males have a mean snout-vent length of 80.14, whereas 38 females have a mean of 86.24 mm.). There is only a slight difference in femoral pores for

males and females in the material examined. Females seem to have a larger number of dorsal scales than males [♂ 42 (193.6) 180-206; ♀ 38 (196.7) 180-213]. Ventral scales, counted medially, are also slightly higher in females [♂ 42 (100.2) 90-112; ♀ 36 (102.08) 90-117].

Specimens from the Nevada Test Site have slightly greater snout-vent lengths [♂ 12 (81.64) 46-119; ♀ 18 (96.83) 79-125]. Femoral pores in females from the NTS specimens were also slightly more than in samples from western Utah [♂ 14 (39.21) 36-43; ♀ 19 (40.58) 37-45]. There are only slight differences in the mean of the postmentals in the NTS and western Utah samples:

Utah ♂ 27 (4.15) 2-6; ♀ 22 (3.95) 3-6
Nevada ♂ 14 (4.43) 2-6; ♀ 19 (3.94) 2-7

Remarks—Existing populations of *C. wislizeni* occur in many of the valleys of the northern and western Great Basin. In many cases this species occurs in pinyon-juniper areas of the foothills of the larger mountain ranges. However, it is primarily found in the valleys, many of which were inundated by water during the Pluvial periods.

Whether populations of this species could have existed in the northern Great Basin during the various Pluvial periods poses an interesting and speculative problem. Its present wide distribution suggests that it may have survived in somewhat moister situations and possibly has become restricted in its distribution to the foothill areas adjacent to some of the Pluvial lakes; or it may have more recently migrated northward from areas in the southwestern United States, western Mexico, and Baja California where populations still exist.

Genus *Sauromalus* Dumeril

Sauromalus obesus obesus Baird

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17273-4, 17434-35, 20778-80, 2138).

Calif.: Inyo Co., Sleeping Sprs. Mt. (B.Y.U. 20777); S. B. Co., 50 mi N Barstow near Fort Erwin (B.Y.U. 21031-2).

Variation—The present series does not differ to that presented by Tanner and Jorgensen (1963).

Remarks—Although chuckwallas inhabit the rocky foothills and mountains of the southwestern deserts, they do not ascend to the Pinyon-Juniper biotic communities. We therefore believe that this species is also one which has entered these more northern valleys in post-Pluvial times.

Genus *Callisaurus* Blainville

Callisaurus draconoides rhodosticus Cope

Material Examined—Nev.: Nye Co., Nuclear Test Site, near Mercury (B.Y.U. 17413, 16323-33, 20781-83, 17915-6, 20784-20805).

Variation—In the above samples males attain a longer mean snout-vent length than females [♂ 13 (68.8) 31-89; ♀ 24 (61.6) 33-80]. Leg lengths are also longer in males than in females [♂ 13 (65.4) 31-85; ♀ 24 (61) 32-78]. Males have much longer tails than females [♂ 8 (104.5) 86-122; ♀ 16 (86.5) 54-104]. Ventral scale counts and femoral pores show no conspicuous differences in the sexes.

Remarks—Although populations of lizards of this species occur in the southern and western Great Basin, they do not seem to occur in the Bonneville Basin. There is need for further sampling in the Escalante Desert area in the southeastern Great Basin to verify this point. As has been already stated by one of us (Banta 1963a) the occurrence of *Callisaurus* in the Lahontan Basin in the western Great Basin is probably a post-Pluvial phenomenon.

Genus *Sceloporus* Wiegmann

Sceloporus magister uniformis Phelan and Brattstrom

Material Examined—Calif.: L. A. Co., 2 mi E Littlerock (B.Y.U. 13175); Llano (B.Y.U. 15074-15079).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17420-33, 18982-3, 20805-14).

Variation—Smith (1939) noted that "there is no geographical correlation in the . . . variational data. Extremes or near extremes are found in all parts of the range of *magister* . . ." Phelan and Brattstrom (1955) and Tanner (1956) have found sufficient differences in some characteristics to warrant the designation of subspecific categories for several populations in and adjacent to the southern and western portions of the Great Basin.

Males have a greater snout-vent length than females [♂ 11 (92.09) 67-104; ♀ 15 (84.73) 47-100]. Femoral pores show only slight differences in the sexes [♂ 11 (25.8) 22-31; ♀ 15 (25.4) 23-28]. Dorsal scales also show slight sexual differences [♂ 11 (32.73) 30-36; ♀ 15 (33.6) 31-36], as is likewise the case with ventrals [♂ 11 (39.81) 36-43; ♀ 15 (39.4) 36-43]. There seem to be no obvious differences between our limited samples from California and Nevada.

Remarks—Populations of this species occur in the Mojave Desert of southeastern California and adjacent Nevada and extend northward into the basin of pluvial Lake Lahontan. It is not yet established whether this species occurs in the Escalante Desert of the southern Bonneville Basin. The higher elevations and more mesic areas (piñon-juniper) separating the southern Bonneville Basin from the Virgin River drainage may have prevented the establishment of populations there.

Sceloporus undulatus elongatus Stejneger

Material Examined—Utah: Sevier Co. Sigurd, 9.5 mi SE (B.Y.U. 12717), Mt. E Richfield (B.Y.U. 11840). Sanpete Co., Manti (B.Y.U. 1469, 14167).

Variation—The limited samples available at this time do not permit us to comment upon the relationships of this form to the *S. occidentalis* complex. Our samples are so limited that we can only list the meristic and morphometric data: Snout-vent length: ♂ 1 (61) 61; ♀ 2 (72.5) 70-25. Femoral pores: ♂ 1 (38) 38; ♀ 2 (31) 25-37. Dorsal scales: ♂ 1 (46) 46; ♀ 2 (52) 51-53. Ventral scales: ♂ 1 (53) 53; ♀ 2 (52.5) 49-56.

Remarks—The occurrence of populations of *S. undulatus elongatus* in only certain sections of the extreme limits of the eastern Bonneville Basin suggests that this species probably did not occur in the Bonneville Basin during the last Pluvial Period and populations are only now beginning to move from the Upper Colorado Basin into the more favorable areas provided since the drying up of Lake Bonneville.

The relationships between the *S. occidentalis* complex and *S. u. elongatus* need further study. We would suppose that *S. undulatus elongatus* is actually closer to *S. occidentalis* than to the more eastern North American populations of *S. undulatus*. Detailed color notes, behavioral observations, ecological preferences, and possibly comparisons of blood serum proteins by available techniques of microelectrophoresis might help in resolving this problem.

Sceloporus occidentalis longipes Baird

Material Examined—Nev.: Elko Co, Lyman Sprs. (B.Y.U. 10766-70). Nye Co., NTS, Mercury (B.Y.U. 17414-9, 18504, 18729-33, 20815-43, 20927). Douglas Co., 12 mi N State Line (B.Y.U. 16707).

Utah: Box Elder Co., Patterson Pass (B.Y.U. 11894-5); Tooele Co., Low (U. of U. 933-4), 3 mi W Ophir (U. of U. 2014, 2016, 2018), Dugway P G (B.Y.U. 14796, 14824-9, U of U. 3399-3400), 10 mi N Ibapah (U. of U. 2894), Gold Hill (U. of U. 784-5), Desert Mtns., 14 mi N and 12 mi E Wendover (U. of U. 3263-5). Utah Co., Chimney Rock Pass (B.Y.U. 2201-9, 2839), Sunshine Cn. (B.Y.U. 411), Elberta (B.Y.U 21711, 21720, 21722, 21577-9 and 21983-4), 7 mi W Elberta (B.Y.U. 21915, 22141, 22146), Geneva slag pile (B.Y.U. 16656). Juab Co., Deep Cr. Mtns., Thomas Cr. (B.Y.U. 11297). Millard Co, Desert Range Exp Sta. (B.Y.U. 8314). Washington Co., 4 mi N Central (B.Y.U. 12191). Beaver Co., 4 mi W Milford (B.Y.U. 21035, 21037, 21934).

Variation—Bell (1954) resurrected the name *S. o. longipes* for Great Basin populations. Although some authors (e.g., Norris 1958) have not recognized the validity of this designation, we believe Great Basin populations are sufficiently distinct, based on meristic and color pattern characteristics (Banta 1965) from populations occurring in southwestern California and northern Baja California, as to warrant such status.

Males attain a longer snout-vent length than females [♂ 10 (76) 69-83; ♀ 12 (72.33) 56-80]. Females have slightly more ventral scales than males [♀ 12 (55.09) 49-60; ♂ 8 (53.24) 52-56].

Femoral pores show little sexual dimorphism [♂ 8 (31) 28-33; ♀ 12 (30.5) 27-36], as is likewise the case with dorsal scales [♂ 8 (44.5) 43-46; ♀ 11 (44) 41-46]. The ventral color pattern of live lizards is distinct when compared with other *Sceloporus* from the Great Basin and particularly those occurring in the Bonneville Basin. A single median blue throat spot and a yellowish-orange color on the legs and edges of the abdomen are peculiar to this species.

Sceloporus graciosus graciosus Baird and Girard

Material Examined—Ida.: Cassia Co., Oakley (B.Y.U. 434, 1424).

Nev.: Elko Co., 20 mi E Wells (B.Y.U. 420, 1803). W. P. Co., Lehman Caves (B.Y.U. 645, 1802; Big Sp., Preston (B.Y.U. 9947), Sacramento Pass (B.Y.U. 9754-62), Hot Cr. Sprs. (B.Y.U. 9814), Ely (B.Y.U. 18175 and 18253). Nye Co., Pahute Mesa, NTS (B.Y.U. 22222-4).

Utah: Cache Co., Wellsville Cn. (B.Y.U. 11910-15). Box Elder Co., Patterson Pass (B.Y.U. 10348-54), Raft R. Mtns., Rosevere Cr. (B.Y.U. 435, 1420, 1422). Rich Co., N fk. Woodruff Cr. (B.Y.U. 12629-30). S. L. Co., City Cr. Cn. (U. of U. 672). Utah Co., Provo Bench (B.Y.U. 426, 1401-5, 1407, 1409-10, 1417, 1786-7, 11814-5), West Cn. (B.Y.U. 2241-6, 2851, 13239). Aspen Gr. (B.Y.U. 2825, 3940-1), Grove Cr. (B.Y.U. 594, 1891-4), 4 mi SW Lehi (B.Y.U. 2787, 4323-7), Payson (B.Y.U. 427), Spanish Fk. Cn. (B.Y.U. 431, 1413, 1415-6), Oquirrh Mtns., West Cn. (B.Y.U. 643), Cedar V. (B.Y.U. 4186-8), Diamond Fk. Cn. (B.Y.U. 422). Tooele Co., Mercur (B.Y.U. 20976), 4 mi S Tooele (B.Y.U. 23574). Juab Co., Yuba Dam (B.Y.U. 12887), 10 mi N Lynndyl (B.Y.U. 2730, 3019, 11872, 11880-2). Cherry Cr. (B.Y.U. 9060-2), Mammoth (B.Y.U. 11839). Sanpete Co., Maple Cn. (U. of U. 513), Ephraim (U. of U. 627-30), Indianola (B.Y.U. 11933-4), Fairview (B.Y.U. 2270-1, 2860). Sevier Co., Salina Cn. (U. of U. 1736-8). Richfield (U. of U. 787-90, B.Y.U. 11841-3). 8 mi SE Sigurd (B.Y.U. 12621, 12702-4). Millard Co., Lynndyl (B.Y.U. 3691, 3693-4), Cove Ft. (B.Y.U. 2037-8, 2717), Fillmore Cn. (U. of U. 2413-9, B.Y.U. 11942-3 and 16560). Antelope Sprs. (B.Y.U. 430, 1411-2, 1414, 1418). 15 mi NW Fillmore (B.Y.U. 11937, 11939-41). Beaver Co., Wildcat (B.Y.U. 9768, 9771, 9773-4). Garfield Co. Bryce Cn NP (B.Y.U. 644, 1406), Hatch (U. of U. 236, 351, 928, 1352, 1715, 1739, 2009-15, 2248, 2266, 2269, 2273, 2276, 2281, 2285, 2312-22, 2714, 3095, 3102, 3224-5, 3235-6, and 3305-8). Piute Co., Marysvale (B.Y.U. 439, 11837).

Variation—There seems to be only slight differences in snout-vent length for males and females [♂ 92 (48.77) 26-62; ♀ 86 (48.9) 26-68]. Femoral pore counts are slightly higher in females [♂ 91 (25.9) 21-30; ♀ 82 (26.4) 22-32] Dorsal scales are also similar in number in the sexes [♂ 89 (48.5) 43-56; ♀ 87 (48.25) 37-57], and the same situation applies to ventrals [♂ 88 (54.9) 46-62; ♀ 78 (54.2) 49-61]. We can conclude from these figures that sexual

dimorphism is not as highly developed in the scale patterns in *S. graciosus* as it is in most other iguanid lizards occurring in the Great Basin.

Remarks—The present distribution of *S. graciosus*, which is widespread in the entire Bonneville Basin, including the area formerly inundated by Pluvial Lake Bonneville, relates the movements of the populations from above the lake level in Pluvial times to lower elevations at the present time.

The ecological distribution is also more extensive than that for most other Great Basin genera (except *Eumeces* and *Phynosoma*). Sagebrush lizards occur altitudinally from the desert flats well into the higher Juniper-Pinyon Pine and oakbrush habitats. They are known to reach elevations above 7,000 feet.

Genus *Uta* Baird and Girard

Uta stansburiana stansburiana Baird and Girard

Material Examined—Nev.: Elko Co., Lyman Sprs. (B.Y.U. 8305). Nye Co., 19 mi S Sunnyside (B.Y.U. 9783-7), NTS, Mercury (B.Y.U. 17282-17307, 17331, 17462-17562, 17912-17914, 18973-18976, 18986-18989, 20869-20926). W. P. Co., Lehman Cave (B.Y.U. 614).

Utah: Box Elder Co., Locomotive Sprs. (U. of U. 1684-6), Dolphin Id. (U. of U. 1742-3); Grouse Cr. Mtns., Rosebud Cr. (B.Y.U. 492), Lucin (B.Y.U. 493, 1558-9) 6 mi W, 12 mi N Corrina (U. of U. 3248). Tooele Co., Salt Spr. (U. of U. 199), Low (U. of U. 938); Willow Sprs. (U. of U. 674-6, 2348), 4 mi W Grantsville (U. of U. 1996-9, 2008), Ibapah (B.Y.U. 490, 1565-8), Gold Hill (U. of U. 461-471a-b, B.Y.U. 4193-4, 10188-91), Skull V. (U. of U. 1225, 938a, 638, 638b), Indian Sprs. (B.Y.U. 10054-6), Fish Spr. (B.Y.U. 9316-9), Dugway P G (U. of U. 3407-8), near Johnson's Pass, Stansbury Mtns. (U. of U. 746-9), W side Great Salt L. (U. of U. 1717-8), Stansbury Id. (U. of U. 1747, 2328-30), Skull V., W side, 2 mi S Orr's Ranch (U. of U. 527-534). Cedar Mtns. (U. of U. 501-4). S. L. Co., S. L. City (U. of U 858a, B.Y.U. 2921, 3516-8). Utah Co., 2 mi W Elberta (U. of U. 713-5), Lake Mtns. (U. of U. 2335-6, 2350-1, 2323-7), 3 mi N Elberta (B.Y.U. 8197-8200, 8325, 8790, 10374-7), 2 mi W Elberta (U. of U. 713-5), Provo (B.Y.U. 616, 1690-1), Chimney Rock Pass (U. of U. 2039-68, B.Y.U. 2837, 8488, 9839, 12197, 2199-2200, 2215), Sunshine Cn. (B Y.U. 436), Payson (B.Y.U. 1018, 9793), 4 mi SW Lehi (B Y.U. 621, 2078, 2785, 4185, 8794, 8938-40), Pelican Pt., W side Utah L. (U. of U. 505, 615-621). Juab Co., Gandy Spr. (B.Y.U. 9296-9306), Yuba Dam (B.Y.U. 9820, 11505-7) Lynndyl (B Y.U. 9063-66), Trout Cr. (B.Y.U. 9307-13), Cherry Cr. (B.Y.U. 3314-5), Callao (B.Y.U. 494, 1560, 9323). Sevier Co., Richfield (U. of U. 58-9), Salina Cn. (U. of U. 1724-35). Millard Co., Desert Range Exp. Sta. (U. of U. 2806), Margum Pass (B.Y.U. 9817-9, 11525-7), Lynndyl (B.Y.U. 623, 10178, 12456), Delta (B.Y.U. 12933), 2 mi S, 2 mi W Oak City

(U. of U. 3302-4). Beaver Co., Beaver (B.Y.U. 10275), Wah Wah Spr. (B.Y.U. 11529-31).

Variation—Some aspects of the variation within populations of this species seem to be "clinal." Camp (1916) noted that the number or dorsal transverse scale rows increases from south to north. Parker (1951) made a study of populations of this form in western Utah and southern Nevada in an attempt to discern the boundary between the then recognized subspecies *stejnegeri* and *stansburiana*. He showed that the characters used to differentiate these two nomenclatural forms breaks down, and, although not stated specifically, Parker's data eliminates *stejnegeri* (Schmidt 1921) from the Great Basin fauna. The name *U. s. stejnegeri* should be restricted to populations inhabiting the Chihuahuan Desert of New Mexico, central and eastern Arizona and adjacent regions in Mexico, as has already been stated by Tanner and Jorgensen (1963).

Genus *Phrynosoma* Wiegmann

Phrynosoma douglassi ornatum Girard

Material Examined—Nev.: Washoe Co., Wadsworth (U. of U. 175). W. P. Co., Ely (B.Y.U. 18173-4, 18254).

Utah: Tooele Co., Rush V. (B.Y.U. 12711), Dugway P G (B.Y.U. 14841-2), Tooele V. (U. of U. 368, 368a, 205), near Stansbury Id. (B.Y.U. 11977-8). S. L. Co., S. L. City (U. of U. 858b, 1968, 57369a, B.Y.U. 11973-4, 11976), Emigration Cn. (U. of U. 2846). Ft. Douglas (B.Y.U. 2778, 2097, U. of U. 9, 374, 1969-70, 2306), no definite locality (U. of U. 126-9). Utah Co., Mt. Timpanogos (B.Y.U. 8051-3), Lehi (B.Y.U. 2786), Alpine (U. of U. 369), 5 mi SW Saratoga (B.Y.U. 15091), Utah L., W side (U. of U. 2263), Provo (B.Y.U. 3356, 8062), Hobble Cr. Cn. (B.Y.U. 13132). Millard Co., Desert Range Exp. Sta. (B.Y.U. 4331), Cove Ft. (B.Y.U. 8034). Juab Co., Eureka (B.Y.U. 8874), Fish Spr. (B.Y.U. 11979). Sanpete Co., Indianola (B.Y.U. 6032, 14788), Fairview (B.Y.U. 2859). Sevier Co., Fish L. (B.Y.U. 11221). Garfield Co., Bryce Cn. N P (B.Y.U. 1838, 8055, 11982, 14782). Washington Co., Blue Sprs. (B.Y.U. 3103).

Variation—The most recent review of the genus is that of Reeve (1952). Several of the morphological characters used to separate the various nominal varieties of *P. douglassi* are of questionable significance. The bordering of the dorsal spots posteriorly and mesially in a light color is a variable one suggesting clinal trends. At the present time we have not examined adequate samples of populations of this lizard to show the extent of variation within any one geographic area in the Great Basin.

Females have a greater mean snout-vent length than males [♀ 23 (66.9) 28-94; ♂ 11 (60.9) 39-88]. Femoral pores are only slightly greater in males than in females [♀ 33 (28.9) 20-33; ♂ 10 (29.8) 25-36], and there are only slight dimorphic differences in ventral scales [♀ 21 (68.9) 62-80; ♂ 9 (68.4) 61-76].

Remarks—Bell (1829) in the original description of *P. douglassi* remarked that these horned lizards are always found near water. Many of the distribution records are from higher elevations. Cockerell (1901) recorded a specimen of the related subspecies *hernandesi* collected at 10,000 feet in the Las Vegas Mountains in New Mexico. Specimens from Bryce Canyon National Park were taken from localities up to 9,000 feet.

From the available distribution records one could develop the hypothesis that populations of *P. douglassi* could have, and probably did, have a much more extensive distribution in the western Great Basin during the various moist periods of the Pleistocene. With the subsequent desiccation of the intermontane pluvial lakes and the incursion of more southern forms into the northern valleys, coupled with the climatic changes leading to the development of desert or semi-desert conditions, populations of *P. douglassi* have been and possibly still are continuing to retreat northward in the valleys and to the more humid environs afforded by the higher mountain ranges.

Phrynosoma platyrhinos platyrhinos Girard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17436-17461, 18968, 18977-8, 18987, 20863-8), Warm Spr. (B.Y.U. 18053). Washoe Co., Wadsworth (U. of U. 803). W. P. Co.: Sunnyside (B.Y.U. 10535).

Utah: Box Elder Co., Lucin (B.Y.U. 13016). Tooele Co., Fish Spr. (B.Y.U. 9416, 12957), Cedar Mtns. (U. of U. 202), Tooele V. (U. of U. 440-2), Low (U. of U. 936), Gold Hill (B.Y.U. 14781, U. of U. 2119), Skull V., Willow Spr. (U. of U. 1224a), Skull V., 18 mi SW Orr's Ranch (U. of U. 2233), Cobblestone den, near Grantsville (U. of U. 2007, 2826, 2827a), Utah-Nev. line on rd. to Gold Hill and Ibapah (U. of U. 3058), Desert Mtns., 14 mi N and 9 mi E Wendover (U. of U. 3250-6), Desert Mtns., 15 mi N and 13 mi E Wendover (U. of U. 3271-3), Dugway PG, SE Camel Back (U. of U. 3403-5), Dugway PG, 2 mi W Cedar Mtn. (U. of U. 3409), Dugway PG, Whiskey Spr. Cn. (U. of U. 3406). Weber Co., Ogden (U. of U. 1699). Utah Co., Chimney Rock Pass (B.Y.U. 2838, 12557, U. of U. 2023-5, 2069-72, 2074), Blowhole country, W side Utah L. (U. of U. 2210-16). Juab Co., Yuba Dam (B.Y.U. 9956-7). Topaz Mtn. (B.Y.U. 9073). Millard Co., Iber (B.Y.U. 12679), Desert Range Expr. Sta. (B.Y.U. 12954, 12957), Gandy (B.Y.U. 9407), Delta (U. of U. 1937).

Variation—*Phrynosoma platyrhinos* occurs in the Great Basin, portions of Upper Colorado Basin of southeastern Utah, northern Arizona and the Colorado Basin of southeastern Utah, northern Arizona and the Colorado Desert of southern California and northeastern Baja California. The species complex, as it is now understood, suggests that the group as a whole is in need of review beyond that provided by Reeve (1952).

Utah samples show slight sexual differences in snout-vent length [♂ 19 (67.1) 52-79; ♀ 23 (67.8) 31-80], whereas in the Nevada

Test Site material the females are larger than the males [♂ 19 (63.57) 29-78; ♀ 13 (67.84) 35-87]. Femoral pore counts exhibit slight sexual differences in both the Utah and Nevada material:

Nevada ♂ 18 (17.66) 14-21; ♀ 13 (18.15) 16-21
Utah ♂ 20 (19.7) 16-24; ♀ 24 (18.66) 14-26

In Nevada specimens ventrals are noticeably higher in females than males [♀ 13 (85.54) 74-92; ♂ 19 (82.68) 74-90] but in Utah samples they are only slightly higher in males [♂ 20 (78.55) 68-88; ♀ 26 (77) 68-87].

Remarks—Bryant (1911) wrote that *P. platyrhinos* "is truly a desert species and is found in the most arid and barren places." Available records tend to support Bryant's statement, with modifications to the effect that populations also occur in areas that are not extremely arid. Populations of this lizard also exhibit a considerable altitudinal and latitudinal distribution. However, they do not seem to occur at such high elevations or in such moist situations as do populations of *P. douglassi*.

Reeve (1952) regarded *P. platyrhinos* as one of the oldest members of the genus. On the basis of an examination of the distributional records alone, Reeve's interpretation may be untenable. Morphologically, *P. platyrhinos* is a more complex form than *douglassi*. Combine the distributional data with that of morphology, with *douglassi* occurring in more moist areas and with far fewer expressions of development of the ornamentation of cephalic spines, and the conclusion that *douglassi* is more primitive than *platyrhinos* could be drawn. We are inclined to accept *platyrhinos* as the most specialized and aggressive horned lizard in the Great Basin.

Family Xantusidae

Genus *Xantusia* Baird

Xantusia vigilis vigilis Baird

Material Examined—Calif.: S. B. Co., Cajon Pass (B.Y.U. 2733, 3025, 3030-31, U. of U. 102, 104).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17932, 21760-21780).

Variation—Sexual dimorphism is not well developed and we did not reliably determine the sexes of the samples observed. Such a reliable sex determination would necessitate histological section of the gonads, and this was not done.

There are slight differences to be noted in the sample from Mercury, Nevada, in comparison to Cajon Pass, California. The California samples had a slightly larger mean dorsal scale count of 104 (N=6) in comparison to 100 81 (N=16) for Mercury. The ventral counts for the California samples were lower (28.66—N=6) than the Mercury samples (30.06—N=16). The mean snout-vent lengths of the California samples were larger (41—N=6) than the Mercury samples (35.5—N=20). It must be pointed out that these

are very tentative comparisons and a much more intensive examination of xantusiid material is necessary before more exact parameters of variation within the various populations can be determined.

Data available for the Washington County, Utah, population provides the following averages for dorsals (104.00), ventrals (29.12) and femoral pores (16.40). The slight variations suggest that the Great Basin populations of *X. vigilis* are similar throughout but with slight clinical variations appearing such as in femoral pores, Cajon Pass (14.83), Mercury (16.14) and SW Utah (16.40). Variations of additional characters of *Xantusia* are listed by Tanner (1957).

Remarks—Turner (1959) reported the collection of several specimens of this species from various elevations in the Panamint Mountains, Inyo County, California, ranging as high as 8,500 feet. Previously populations of *X. vigilis* were unknown from such high altitudes and the species was considered to be restricted to the Joshua tree covered alluvial fans and flaked granite outcrops of the lower mountain ranges. Turner's report opens up an entirely new aspect of the distribution of *X. vigilis*. On just what mountain ranges do populations occur? What is the actual extent of altitudinal variation of their distribution? Banta (1963b) has remarked upon the species' occurrence in the Inyo and Nelson Mountains of the Saline Valley hydrographic basin, Inyo County, in situations where Joshua trees are either nonexistent or greatly reduced.

The restriction of populations of this lizard to special moist situations either in decaying Joshua tree trunks or under debris at the higher elevations of the mountain ranges in the southwestern Great Basin suggests that the animal could have survived around the lake-filled basins during the various Pluvial periods. With the desiccation of the various lakes and the developing aridity, the lizard presumably retreated to the favorable situations afforded by Joshua trees and the higher elevations of the desert mountain ranges.

According to Savage (1952) the subspecies *X. v. vigilis* is believed to be the progenitor to the nominal forms that he discussed from Baja California, Mexico.

Family Teiidae Gray

Genus *Cnemidophorus* Wagler

Cnemidophorus tigris tigris Baird and Girard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17269-72, 17281, 17334-17368, 17563-17616, 20844-20862); Lockes (B.Y.U. 18051-2).

Utah: Box Elder Co., Bird Id., Great S. L. (U. of U. 793). Tooele Co., Dugway PG (B.Y.U. 14811-7, 14851, 14874, U. of U. 3395-8), Cedar Mtns. (U. of U. 463). Desert Mtns., 14.5 mi N and 12 mi E Wendover (U. of U. 3257-62); Skull V. (U. of U. 842), Low (U. of U. 935-935a), Knoll (B.Y.U. 2919), Gold Hill (B.Y.U. 11951). S. L. Co., S. L. City (U. of U. 3012, 496-9, 508-9, 646-7, 2275), Univ.

Utah (U. of U. 355), Dry Cn. (U. of U. 419), City Cr. Cn. (U. of U. 671), North S. L. City (U. of U. 2264), near Ft. Douglas (U. of U. 3410), Sandy (U. of U. 269). Utah Co., Elberta (B.Y.U. 16603-6), Rock Cn. (B.Y.U. 8758), Provo, Bonneville Bench (B.Y.U. 578), Springville (U. of U. 487), Blowhole country, W side Utah L. (U. of U. 2288-92, 2337), Grove Cr. (B.Y.U. 586, 1824), 6 mi N Goshen (B.Y.U. 577, 1806-7, 1880, 11944, 8493-5). Millard Co., Sand dunes (B.Y.U. 10177), Lynndyl (U. of U. 464), Oak City, 2 mi S and 2 mi W (U. of U. 3309-14). Sevier Co., Richfield (U. of U. 139), Salina Cn. (U. of U. 1719-23). Juab Co., 4 mi E Cherry Cr. (B.Y.U. 9402, 13024). Iron Co., Cedar City (B.Y.U. 194). Beaver Co., Wah Wah Spr. (B.Y.U. 11949).

Variation—Camp (1916) remarked that specimens from the southern areas of this lizard's distributional range possessed darker ventral colors and a larger size than the lizards obtained in the more northern areas. Burt (1931) noted that in Great Basin specimens "the dorsal coloration . . . is predominantly brown and the ventral coloration often deep black or slaty," and that "specimens from the lower levels, particularly from deserts, tend to become brownish above and black below, whereas those from the higher, more mountainous districts tend to become black above in ground color and white below." In the desert specimens "the dorsal pattern is poorly defined, but it is well defined in the mountain specimens."

Specimens examined show some sexual dimorphism in snout-vent length with males being larger than females. This is true of the limited Utah samples [♂ 11 (79.63) 44-99; ♀ 8 (74.5) 42-97], and the more extensive Nevada Test Site material [♂ 52 (85.63) 76-95; ♀ 43 (83.74) 71.98]. There is only limited sexual dimorphism in femoral pores and dorsal scales. As already indicated there are significant differences in size between the Utah and Nevada Test Site samples. However, we desire additional material from more areas in western Utah before final evaluation is made of these data.

Remarks—This single representative species of the essentially South American lizard family Teiidae (Dunn, 1931) is widespread throughout the entire Great Basin and adjacent areas. Although large populations are frequently found in the numerous Great Basin valleys, they also occur in the lower foothill areas as well.

The extreme variation in altitude and latitude exhibited by present populations of this lizard suggests that previous populations could have survived the pluvial periods in and around the freshwater lakes extant at that time.

Family Scincidae Gray

Genus *Eumeces* Wiegmann

Eumeces skiltonianus utahensis W. Tanner

Material Examined—Ida.: Bannock Co., Lava Hot Spr. (B.Y.U. 11645).

Nev.: Lincoln Co., Pioche (B.Y.U. 533). Nye Co., NTS. Mercury (B.Y.U. 17933-17928, 22208 and 22225). W. P. Co., Lehman Caves, N.M., Baker (B.Y.U. 13753-55).

Utah: Beaver Co., Milford (B.Y.U. 535, 23576-7 and 23578-80), 12.3 mi N Beaver on west side highway 91 (B.Y.U. 12661-12664, 12705, 12706, 12725, 12726). Box Elder Co., 8 mi W Rosette (U. of U. 2652). Juab Co., Cherry Cr. (B.Y.U. 9067). Piute Co., near Circleville (U. of U. 1326). S. L. Co., Ft. Douglas (U. of U. 361). Sanpete Co., Ephraim (U. of U. 189). Sevier Co., 9 mi SE Sigurd (B.Y.U. 11759-60, 12639-42), .3 mi E Sevier-Millard Co. line (B.Y.U. 12660). Summit Co., Peoa (B.Y.U. 648). Tooele Co., 5 mi N Ibapah (U. of U. 2637), Faust Cn. (U. of U. 1671). Utah Co., Cabins West Cn. (B.Y.U. 2849-50, 2217-30, 2292-3, 2231-3139, 15048, 16621, 16651, 21939-21948), Diamond Fork Cn. (B.Y.U. 2780), Spanish Fork Cn. (B.Y.U. 536, 1795-6), Cedar V. (B.Y.U. 537, 2099), West Cn., N Cedar Ft. (B.Y.U. 12652-7, 12659, 13133-13750, 13766, 13756-13765, 13778-80), Cn. above Mercur (B.Y.U. 12651), Cedar V. (B.Y.U. 6945-6, 10402, 11970). Washington Co., Pinto (B.Y.U. 10540).

Remarks—The distributional pattern of this form is somewhat comparable with the iguanids *Sceloporus occidentalis* and *S. graciosus*. Like both *S. occidentalis* and *S. graciosus*, *E. skiltonianus* inhabits lower elevations in the northern Great Basin and is restricted to higher altitudes of the larger isolated mountain ranges in the south. Also, as for *S. occidentalis*, the larger, more continuous populations of the species complex occur in mountain ranges and foothill areas of the Pacific Coast of California, Oregon and Washington.

Knowledge pertaining to the distribution of this species is extremely spotty. This is due primarily to the fact that collecting activities have been restricted, and, owing to the fact that in those areas visited by the numerous collectors of zoological specimens over the years, concern for obtaining suitable samples of lizard specimens has been limited.

Populations of *Eumeces skiltonianus* possibly could have occupied more extensive areas than at present during some of the more humid periods of the Tertiary, which, according to the works of Axelrod (1940, 1948, 1950, 1956, 1957, 1958) and Wells and Jorgensen (1964), is borne out by the paleobotanical record from many localities in the Great Basin.

According to Norris (1958) the "lack of differentiation of the isolated populations points to a Pleistocene separation." As has been pointed out by Banta (1963b) populations of this lizard would have been very comfortable in the more moist environments surrounding the various Pluvial lakes during the Pleistocene. With the desiccation of the Pluvial lakes, as a result of increasingly arid conditions, populations survived only in the more mesic niches occurring in the higher mountain ranges or along the courses of the more permanent streams. This type of distribution is particularly apparent in the mountains of Nevada.

Eumeces gilberti rubricaudatus Taylor

MATERIAL EXAMINED—CALIF.: Inyo Co., Nelson Mtns., Saline Valley hydrographic basin (B.Y.U. 16566).

REMARKS—The distribution of this skink is poorly known in the southeastern Great Basin. Hardy (1948) reported a specimen from the Sheep Mountains, indicating that the distribution extends across southern Nevada east of Saline Valley. Banta (1962) reported the occurrence of this species in the Spring (Charleston) Mountains of Clark County. Bradley and Deacon (1966) reported additional material verifying the occurrence of this species in the Spring Mountains.

Order: Serpentes

Family: Boidae

Genus *Charina* Gray

Charina bottae utahensis Van Denburgh

MATERIAL EXAMINED—IDA.: B. L. Co., Paris (B.Y.U. 93).

UTAH: Weber Co., Ogden (U. of U. 1746). Davis Co., Ward Cn. (U. of U. 2832). S. L. Co., S. L. City (U. of U. 832, 2003, 1984, 2118, 2243, 2828, 2648, 2825), Alta (U. of U. 2844), Little Cottonwood Cn. (U. of U. 3222). Summit Co., Woodland (B.Y.U. 2850). Wasatch Co., Wallsburg (B.Y.U. 2936). Utah Co., Aspen Grove (B.Y.U. 87, 91, 95, 674, 690, 842-850, 888, 1386-7, 1834-5, 1951-54, 3644, 4303-4, 8091, 8484, 8885, 10238-42), Provo Cn. (B.Y.U. 94, 676, 2828, 6052). American Fk. Cn. (B.Y U. 691, 2865, 14696), Hobble Cr. Cn. (B.Y.U. 2937), Payson Cn. (B.Y.U. 699, 2725), Rock Cn. (B.Y.U. 676). Juab Co., Salt Cr. Cn. (U. of U. 3015-6). Sanpete Co., 4 mi E Fairview (B.Y.U. 11768).

VARIATION—Van Denburgh (1920b) and Klauber (1943) have shown some of the distinct features of the Great Basin populations compared with those populations inhabiting the more humid regions of the Pacific Coast of North America. Comparable samples from the Toyabe Range (Linsdale 1938, 1940) and other central Great Basin mountains are not yet available for systematic assessment. Only those populations in the Wasatch Mountains along the eastern edge of the Great Basin have been sampled sufficiently to provide variation data (Tanner, 1933).

Snout-vent lengths of males are noticeably greater than females [♂ 22 (390.72) 202-533; ♀ 26 (344.27) 170-586]. This is likewise true of tail lengths [♂ 22 (59.36) 27-83; ♀ 26 (53.27) 22-72]. There is only slight sexual differences in the number of ventral plates [♂ 24 (204.5) 193-214; ♀ 32 (205) 196-212]. Caudal scales are greater in males than females [♂ 23 (36.7) 35-38; ♀ 31 (35.7) 23-38]. Dorsal scales at midbody are also slightly greater in males than in females [♂ 23 (41.8) 40-46; ♀ 32 (41) 39-44].

REMARKS—The disjunction of the distribution of populations of this animal as demonstrated by available published records (Lins-

dale, 1938, 1940) indicate its preference for more humid environments. Indeed this would suggest that *C. bottae* enjoyed a wider distribution during the moister periods of the Pluvial periods and that the present disjunct distributions reflect the environmental changes brought about by the relatively recent desiccation of fresh water lakes in many areas of the Great Basin. Rubber boas occur in isolated island populations in those higher mountain ranges affording suitable habitat.

Family Colubridae

Genus *Thamnophis* Fitzinger

Thamnophis elegans vagrans Baird and Girard

Material Examined—Ida.: B. L. Co., Paris (B.Y.U. 517, 1613). Franklin Co., Clifton (B.Y.U. 250).

Wyo: Uinta Co., Fossil (B.Y.U. 207).

Utah: Box Elder Co., Tremonton (B.Y.U. 180), Snowville (B.Y.U. 182), Rosevere Cr. (B.Y.U. 177, 1038, 1040). Daggett Co., Manila (B.Y.U. 18244, 12986). Cache Co., Logan Cn. (B.Y.U. 186, 1047, 1084), Tony Grove (B.Y.U. 513, 1611-2), Wellsville Cn. (B.Y.U. 185). Summit Co., Beaver Cr. (B.Y.U. 178). S. L. Co., S. L City (B.Y.U. 14680). Juab Co., 30 mi N Delta (B.Y.U. 582). Utah Co., West Cn. (B.Y.U. 2216, 2240, 2848), Nebo Cn. (B.Y.U. 510), Goshen (B.Y.U. 204), Provo (B.Y U. 181, 203, 377, 387, 1031-1035, 1039, 1041, 1044-6, 1050, 1059, 1066, 1085-7, 1133, 1382-3, 8746-7, 9155-6, 10246-9, 10254, 12999, 13003-4, 14677-8, U. of U. 386, 684-5, 3174-7), Spanish Fk. (B.Y.U. 383-4, 1319, 1390-2). Alpine (U. of U. 119, 818), Aspen Gr. (B.Y.U. 102, 187, 1048-9, 1067-1083, 1643), Altamount (B.Y.U. 565), American Fk. (B.Y.U. 14681), Payson (U. of U. 2469-77), Powell Slough (U. of U. 807), Lehi (B.Y.U. 193, 367, 1053, 1058, 1311-4), Provo (B.Y.U. 14991-9, 15025-15034), E side Provo Airport (B.Y.U. 16618-20). Carterville (B.Y.U. 16625). Millard Co., Gandy (B.Y.U. 184, 1042-3). Beaver Co., 2 mi E Minersville (B.Y.U. 579, 1808). Sanpete Co., Fairview (B.Y U. 2753), E Gunnison Reservoir (B.Y.U. 2755), Spring City (B.Y.U. 366). Piute Co., Kingston (B.Y.U. 12916-7) Garfield Co., Bryce Cn. NP (B.Y.U. 544), Antimony (B.Y.U. 174). Washington Co., Enterprise (B.Y.U. 320).

Variation—Fitch (1940, 1948), Tanner (1950), and Fox (1951b), have provided the most recent studies of variation of this garter snake within the Great Basin and adjacent areas.

Mean snout-vent lengths are much greater in males than females [♂ 75 (390.3) 168-577; ♀ 75 (303.72) 150-594]. This difference is also exhibited by tail lengths [♂ 62 (139 8) 53-195; ♀ 65 (117.5) 50-186]. Pronounced sexual dimorphism also occurs in scale characters. Ventral plates are greater in number in males than females [♂ 85 (171.8) 164-180; ♀ 71 (166.24) 158-178] as is likewise the case with caudals [♂ 75 (84.6) 61-94; ♀ 66 (76.77) 67-91]. Dorsal

scales at midbody are very slightly greater in females than males [♀ 72 (20.83) 19-21; ♂ 84 (20.7) 19-21]. Variations occurring in populations from the eastern Great Basin and including many of the specimens listed above as well as specimens from adjoining populations is summarized by Tanner (1950).

Remarks—The fact that a number of specimens of this wide-ranging garter snake have been found away from the immediate proximity to water indicates its adaptation to more terrestrial conditions. This fact alone would account for its pronounced success and present wide distribution throughout the Great Basin. Populations of this snake could have enjoyed as wide or possibly even a much wider distribution, particularly in the desert valleys, during the more Pluvial periods.

Thamnophis sirtalis parietalis Say

Material Examined—Ida.: Franklin Co., Clifton (B.Y.U. 251).

Utah: Box Elder Co., Brigham City (U. of U. 348-9), Chesapeake Gun Club (U. of U. 1350), Cache Co., Dry L. (B.Y.U. 508, 512, 1605-7, 1659, 1678), Logan (B.Y.U. 2833). Davis Co., Farmington (U. of U. 944, 944a, 945, 945a, 946a), Woods Cross (U. of U. 114-5, 1122, 1220), ½ mi SW Phillips Oil Refinery (U. of U. 3054-6, 3060, 3071, 3074, 3076), Kaysville (U. of U. 333), ½ mi N Woods Cross (B.Y.U. 23709-17, 23726). Rich Co., Bear L. (B.Y.U. 209, 929, 1089). Salt Lake Co., S. L. City (U. of U. 46, 204, 204a, 388), Farmington Bay Refuge, 15 mi NW S. L. City (U. of U. 3144-5). Utah Co., Provo (B.Y.U. 210, 382, 1090-92, 1096, 1171, 1384, 1296, 12970-4), Payson (U. of U. 2467-8), American Fk (U. of U. 363), Powell's Slough, Utah L. Shore (U. of U. 808), Salem (B.Y.U. 8750-1), Benjamin (B.Y.U. 8749). Weber Co., Farr West (B.Y.U. 208), Ogden (U. of U. 328).

Variation—The ventrals and caudals are higher in the males than in the females [♂ 34 (164.56) 159-170; ♀ 40 (160.50) 156-168]. Caudals [♂ 31 (83.48) 78-89; ♀ 34 (76.76) 72-84]. There is also a sexual dimorphism in the ratio of the tail to total length with the males 2 to 3 percent longer. [♂ 17 (252) 238-267; ♀ 11 (235) 222-248]. The infralabials vary between 9 and 10 with many specimens having a formula of 9-10.

Remarks—Although Fitch and Maslin (1961) provided a redescription of several recognized subspecies of *Thamnophis sirtalis*, they did not provide specific variation or locality data for material examined in the eastern Great Basin. Their general statement that scalation is remarkably uniform, that variation follows clines and is chiefly to be found in the color pattern agrees generally with our findings. We have examined eighty specimens from the Great Basin and compared them with a small series from the Snake River drainage and a series from Kansas.

The skin pattern as represented for *fitchi* (Fitch and Maslin, Fig. 2) does not represent the pattern generally found in Utah

sirtalis. Although there is individual variation, most specimens show the small red spots above the major red H marks (between the 7-9 scale rows). This character is similar to *parietalis* except that in the Utah series a darker background usually surrounds the red splotches.

The paired dark dots on the anterior edge of each ventral in *parietalis* are also present in most (60 percent) of the Utah series. There is considerable variation as to size, darkness of spot and their regular occurrence on each ventral. There is obviously a difference when compared with Kansas *parietalis* and yet if one is to choose between presence or absence of ventral spots as a key character, most specimens would fall into the *parietalis* subspecies.

Four clutches of young were examined (3 Utah and 1 Kansas) to determine if there was a difference in the color pattern between young and adults. None could be noted; however, it was noted that the individuals of two Utah clutches had ventral spots, whereas in the third, most were without.

On the basis of the material examined we are not convinced that the Continental Divide is the dividing line between *parietalis* and *fitchi*. If specimen characteristics are the criteria to be used, then the Utah series is, on the basis of percentage, a part of *parietalis*. We believe that the populations in southeastern Idaho and northern Utah are more closely related to *parietalis*, but that the influence of *fitchi* is apparent in some local populations, and will become more obvious in more western populations.

We note that Fitch and Maslin (1961:304) place *sirtalis* in the Sevier River valley; however, their distribution map (Fig. 1) extends only into Utah Valley. Our records conform to the distribution map.

Genus *Diadophis* Baird and Girard

Diadophis regalis regalis Baird and Girard

Material Examined—Ida.: Franklin Co., Preston (U.A. Coll.). Nev.: Lincoln Co., 1 mi E Caliente (B.Y.U. 11113).

Utah: Tooele Co., Dugway PG (B.Y.U. 14797-8). Utah Co., Pole Cn. (U. of U. 2006), S fork West Cn. (B.Y.U. 13775, 14168-9, 14672-3, 23329-30). Piute Co., Circleville (B.Y.U. 2701). Millard Co., Fillmore (B.Y.U. 11246). Juab Co., Birch Cr. Cn. (U. of U. 1213). Beaver Co., 10 mi S Minersville (B.Y.U. 21759).

Variation—In the limited samples available females have a longer snout-vent length than males [♂ 4 (341) 280-378; ♀ 10 (351.25) 167-573]. Tail lengths are slightly greater in males than in females [♂ 4 (87) 71-106; ♀ 10 (84.75) 34-120]. Ventral plates are significantly greater in females [♂ 4 (209.33) 208-211; ♀ 10 (227.37) 219-233], and caudals are noticeably greater in males [♂ 3 (73.66) 72-76; ♀ 8 (67.5) 62-72]. Dorsal scales at midbody were usually 17. In none is there an indication of a nape band.

Remarks—As the present records indicate, this is one of a group of colubrid snakes which seems to be restricted to the more moist east-

ern portions of the Great Basin. Its near total absence from the western Great Basin, according to available records, would not indicate a wider distribution into central Nevada during the Pluvial periods. However, the present spotty distribution in Utah and the difficulty in finding it prevents us from precluding its presence in higher ranges of central Nevada.

Genus *Coluber* Linnaeus

Coluber constrictor mormon Baird and Girard

Material Examined—Ida.: Franklin Co., Clifton (B.Y.U. 108, 894-896).

Utah: Box Elder Co., Blue Ridge Mts. (B.Y.U. 98). Cache Co., Dry Lake (B.Y.U. 509), Wellsville Cn. (B.Y.U. 102), Logan (B.Y.U. 2832). Davis Co., Woods Cross (U. of U. 2840-3), Farmington (U. of U. 1453, 1752-54), Farmington Bay (B.Y.U. 2728). S. L. Co., S. L. City (U. of U. 2644, 858c, 2808, 1755-6; B.Y.U. 105), Ft. Douglas (U. of U. 9, B.Y.U. 2777), mth. Emigration Cn. (U. of U. 1400-1), Antelope Id. 5 mi S (U. of U. 2193). Utah Co., Alpine (U. of U. 9A, 9B, B.Y.U. 633), Provo Cn., N. fk. (B.Y.U. 15014), Provo Cn., Girl Scout Camp (B.Y.U. 15014), Provo (B.Y.U. 101, 103, 22094), Hobblecreek Cn. (B.Y.U. 107), Diamond Fk. Cn. (B.Y.U. 104), Aspen Grove (B.Y.U. 110), Rattlesnake spur (B.Y.U. 13043), Saratoga Den (B.Y.U. 1704), Salem Pond (B.Y.U. 2992). Millard Co., Oak Cr. R. S. (U. of U. 3354-6). Sanpete Co., Ephraim (U. of U. 2a-c). Tooele Co., Tooele V. (U. of U. 350). Morgan Co., Morgan (U. of U. 223), E. Como Spr. (U. of U. 1210). Weber Co., Farr West (B.Y.U. 109).

Variation—Sexual dimorphism is developed in the samples examined. Males have a slightly lower ventral count than females [♂ 16 (170.8) 167-178; ♀ 15 (172.8) 168-180]. Females have a lower number of caudals [♂ 16 (93.12) 86-100; ♀ 11 (88.27) 84-92].

Approximately one third of the specimens have seven supralabials on one or both sides; the others have eight. Infralabials have about the same ratio (1.2) of eight and nine scales respectively. The dorsals are uniformly 17 rows anteriorly but are occasionally 16 at the vent.

Remarks—This is a wide-ranging snake. It occurs not only in much of the Great Basin but extends to the Pacific Coast regions of California, Oregon and Washington in a distribution pattern somewhat resembling that of the boid *Charina bottae*. However, populations of the yellow-bellied racer do not seem to be restricted to as moist an environment as *C. bottae* and in the Great Basin are frequently found where streams extend out into the sagebrush-steppe areas which occupy much of the northern parts of the region. It is unlikely that the yellow-bellied racer was affected as much as other Great Basin reptiles by the more moist conditions which prevailed during Pluvial times.

The habitat of this species has been extended in those areas where irrigation is practiced. Presumably it originally inhabited only the stream-side habitats of the valleys and from the oak brush foot hills up to the aspen-conifer forest at elevations of 7,000 ft. Adults have been taken in the spring and fall as they emerged or entered dens also occupied by *Crotalus* and *Pituophis*.

Genus *Masticophis* Baird and Girard

Masticophis taeniatus taeniatus Hallowell.

Material Examined—Nev.: Churchill Co., 90 mi E Fallon (B.Y.U. 16650). Nye Co., NTS, Mercury (B.Y.U. 17409, 18755-6).

Utah: Box Elder Co., Locomotive Sprs. (U. of U. 2000-2004, 917-8, 918a). Tooele Co., Dugway PG (B.Y.U. 14823), betw. Ophir and Mercur (U. of U. 2032), Grantsville (U. of U. 1960, 1967, 2478, 2482), Wendover, 15 mi N and 9 mi E (U. of U. 3253), Lookout Pass (U. of U. 1219a), Gold Hill (B.Y.U. 2998). Utah Co., Meseda Bench Prospect (B.Y.U. 14986). Blowholes, W side Utah L. (U. of U.), Cedar V. (U. of U. 1299, B.Y.U. 2779, 14684), Chimney Rock Pass (B.Y.U. 2842, 14685), Lake Mtn., W side (B.Y.U. 386). Millard Co., 20 mi W Hinckley (B.Y.U. 16590), 3 mi N Cove Ft. (B.Y.U. 568), Desert Range Exper. Sta. (B.Y.U. 563, 1637, 1809). Juab Co., Dividend (B.Y.U. 247), Topaz Mtn. (B.Y.U. 9072). Beaver Co., Milford V. between Milford and Minersville (B.Y.U. 564, 1640-1). Iron Co., Cedar City (B.Y.U. 392).

Variation—Dorsal scale rows at midbody are 15 in all the above specimens. Variation occurs before the vent where there may be 11, 12 or 13 rows. Approximately 65 percent have 12 rows with 11 more common than 13 rows. Sexual dimorphism occurs in the ventrals and caudals, with the females having the higher average ventral count [♀ 21 (207.14) 199-218; ♂ 27 (204.52) 199-210] and the males the higher average caudal count [♂ 21 (139.29) 127-143; ♀ 19 (132.21) 124-147]. Supralabials are usually 8, occasionally 7 or 9. Infralabials are more commonly 9 but with many specimens having 10.

Remarks—Populations of this snake are widespread in the northern two-thirds of the Great Basin. In the southwestern Great Basin populations have become restricted to the higher mountain ranges surrounded by inhospitable hot desert valleys in contrast to the large populations on the foothills and in the valleys of western Utah. This disjunction would tend to indicate that the species did have a wider distribution, probably during Pluvial times, and the distribution we find today occurred during the interval since desiccation of Pluvial lakes and the drastic environmental changes which have occurred since.

Masticophis flagellum piceus Cope

Material Examined—Calif.: Inyo Co., Oasis (B.Y.U. 18048).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17401-8, 17920, 17949, 18048, 18764-7, 23634, 23733). Pershing Co., nr. Lovelock, (B.Y.U. 15238).

Variation—Quite in contrast to the other racers occurring in the Great Basin (*Coluber constrictor* and *M. taeniatus*) this species does not indicate any obvious sexual dimorphism. The ventrals are similar [♀ 12 (195.25) 193-199; ♂ 7 (194.5) 192-195] and the caudal average diverges only slightly more [♀ 12 (105.42) 99-109; ♂ 6 (103.4) 95-109]. There is a wider range of caudal variation in the males.

Other scale patterns show little or no variation; the color pattern is uniform and since all specimens are of the red phase, it has been locally designated as the "Red Racer."

Remarks—Populations of this snake are restricted to the warmer and drier environments of the Lahontan basin of western Nevada, the Mojave, Colorado and Sonora Deserts and the deserts of Baja California. Its present occurrence in the Lahontan Basin is doubtless a post-Pluvial phenomenon for it occurs to a large extent within the areas which were innundated by Pluvial Lake Lahontan, and other Pluvial Basins in southwestern Nevada and east central California.

Genus *Opheodrys* Fitzinger

Opheodrys vernalis blanchardi Grobman

Material Examined—Utah: S. L. Co., Mormon Flats, Emigration Cn. (B.Y.U. 16248). Utah Co., Aspen Grove, Provo Cn., nr. M.I.A. Girls' Home (B.Y.U. 519, 1614-6, 1845, 1936-7, 2397, 2972, 3748, 3782-4, 9.36, 10342-3, 13200, 14380, 15020-3, 15018-23, 16660, U. of U. 35, 314).

Variation—Specimens examined show a considerable degree of sexual dimorphism in the number of ventral plates being significantly higher in females than in males [♀ 24 (147.04) 144-151; ♂ 27 (136.33) 132-140]. Dimorphism also exists in the caudal scale differences but with the males having the higher counts [♀ 20 (71.75) 66-76; ♂ 24 (81.42) 74-89]. Except for an occasional specimen having one or no loreals, all other scale patterns are usually uniform.

Remarks—The smooth green snake is restricted to the Wasatch Mountains bordering the eastern edge of the Great Basin. Many of the present records are from high elevations (Aspen-Conifer forests) having a more moist and cooler climate. It is conceivable, though difficult to establish, that this animal extended its distribution well into the eastern margins of Lake Bonneville during the Pluvial periods and that its present distribution reflects survival of populations only at the higher elevation.

Genus *Salvadora* Cope

Salvadora hexalepis mojavensis Bogert

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U.

17392-17395, 17948, 18736, 18762-18764), C. P. Cane Springs turn off along rd., NTS, Mercury (B.Y.U. 18985).

Variation—Ventral plates in seven males ranged from 196 to 204 with a mean of 198.57. In 3 females the range was 194 to 207 with a mean of 200. Subcaudals in females had a mean of 84.33 with a range of 77-89. In males subcaudals ranged from 89-95 with a mean at 91.66. Males were larger than females in snout-vent length [♂ 7 (521.85) 252-697; ♀ 3 (392.33) 256-494].

Remarks—Patchnose snakes at the Nevada Test Site occur in the valleys and on the adjoining foothills surrounding them. They have been found invading live wire mammal traps in study plots presumably in quest of captured lizards. At the N.T.S. this species is found in habitat commonly inhabited by such species as *Crotaphytus wislizeni*, *Phrynosoma platyrhinos*, *Callisaurus draconoides*, *Masticophis flagellum* and *Crotalus cerastes*.

This species, as in the case of several others, has apparently invaded the western Great Basin since the last Pluvial period.

Genus *Phyllorhynchus* Cope

Phyllorhynchus decurtatus perkinsi Klauber

Material Examined—Nev: Nye Co., NTS, Mercury (B.Y.U. 17924-5, 17758-9, 23730-1).

Variation—Five of the above specimens are males, with 169 to 173 ventrals; the one female has 182 ventrals and 30 subcaudals. Caudals in the males range from 38 to 40 with a mean of 38.6. The female is 371 mm. in total length with a tail of 25 mm. The males range in total length from 253 to 374 with a mean of 325. The male tail lengths range from 33 to 57 with a mean of 48.33. The percent of tail to total length is as follows: males 15 to 16.5 percent and the female approximately seven percent. This sexual dimorphism is also reflected in the caudal counts.

Remarks—Variations in the populations of the northern part of the range are not well understood because of the few specimens available. However, the six sepcimens from the N.T.S. do indicate fewer ventrals, more caudals and longer tails in males, but a shorter tail in the single female. It is possible that there is considerable isolation between the populations occurring in the several pluvial valleys of southwestern Nevada.

Genus *Arizona* Kennicott

Arizona elegans candida Klauber

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17396-7, 17400, 18760); 15 mi NW Main gate, NTS (B.Y.U. 21215); 3.4 mi S Main gate (B.Y.U. 21285); 15.7 mi SE Main gate (B.Y.U. 21284).

VARIATION—Three males and four females have been examined. Sexual dimorphism is apparent but not well developed in the scales which usually reflect it. The ventrals average ♂ 211.7, ♀ 216.5, caudals ♂ 50, ♀ 49. Other scale patterns are within the limits of variation set up by Klauber (1946) for this subspecies.

REMARKS—Tanner and Jorgensen (1963) reported the first record of this subspecies in Nevada. This seems to establish *candida* as the only subspecies occurring in the Great Basin from Nye County north and west into other possible counties in Nevada and in adjoining California. Such a distribution is plausible and leaves southeastern Nevada (Clark Co.) and adjoining Arizona and Utah (Washington Co.) to the northeast in the range of *eburnata*.

Genus *Pituophis* Holbrook

Pituophis catenifer deserticola Stejneger

MATERIAL EXAMINED—IDA.: Bannock Co., Swan L. (B.Y.U. 2875).

NEV.: Lander Co., Battle Mtn. (B.Y.U. 2916, 2979). Nye Co. NTS Mercury (B.Y.U. 17410-12, 17917-8, 18768-18771). W. P. Co., Lund (B.Y.U. 6916).

UTAH: Beaver Co., Milford V. betw. Milford and Minersville (B.Y.U. 566), Milford (B.Y.U. 2736, 3021). Box Elder Co., Hansel V. (PC), Lucin (B.Y.U. 13018), 5 mi E Saline (U. of U. 2822-3), Locomotive Spr. (U. of U. 2031). Cache Co., Smithfield (B.Y.U. 2830), Logan (B.Y.U. 2831, 2193, 2195). Iron Co., Newcastle, 4 mi S (B.Y.U. 16675), Kanarraville (B.Y.U. 393), Hieroglyphic Gap (B.Y.U. 11314). Juab Co., 4 mi S Levan (B.Y.U.), 2 mi S Silver City (B.Y.U. 274), sand dunes 10 mi N Lynndyl (B.Y.U. 2729), Levan (B.Y.U. 16791), Fish Spr. (U. of U. 2234-5). Millard Co., Clear L. (B.Y.U. 11298), S Notch Mtn., U.S. Hwy 6 (B.Y.U. 14697), Desert Range Exper. Sta. (B.Y.U. 16657). Piute Co., 8 mi S Antimony (U. of U. 840). S. L. Co., Ft. Douglas (B.Y.U. 2776, U. of U. 3), Mill Cr. (U. of U. 44943). S. L. City (U. of U. 72), 5 mi SE Antelope Island (U. of U. 2189-92), Sandy (U. of U. 307). Sanpete Co., On rd. to Sterling Reservoir (B.Y.U. 2A), Mt. Pleasant (U. of U. 4). Sevier Co., Marysville Cn. (B.Y.U. 2749), Jct. Sigurd-Richfield rd. (B.Y.U. 670). Tooele Co., Bunker Hill Mine (B.Y.U. 666), Dugway (B.Y.U. 14793-4), Grantsville (U. of U. 2646, 1964-5), Mercur (U. of U. 2026), 3 mi W Willow Spr. (U. of U 1213). Utah Co., Provo Cn. (B.Y.U. 8745, 14987), Provo (B.Y.U. 270, 1170, 1665, U. of U. 339, 380), Pleasant Grove (U. of U. 880), Thistle Cn. (B.Y.U. 2754), Thistle (B.Y.U. 673), Chimney Rock Pass (B.Y.U. 2840, 4248), Manila (B.Y.U. 18245), W Mtns. (B.Y.U. 6944), Grove Cr. (B.Y.U. 585), Pelican Pt. (B.Y.U. 1822-3, U. of U. 943A), Springville (B.Y.U. 342), Tintic (B.Y.U. 2737), Fairfield (U. of U. 1929), Pole Cn. (B.Y.U. 15003), 4 mi W Lehi (B.Y.U. 284, 378, 1099, 1877, 1879, 2715, 2035, 14676), Payson (B.Y.U. 3705), 2 mi W Cedar Ft. (U. of U. 1, 2433).

Variation—Reviews by Tanner (1939), Stull (1940) and Klauber (1947) have provided some insight into the variation of the samples of Great Basin populations which they examined. In each of these reviews the subspecies *stejnegeri* proposed by Van Denburgh (1920) for those populations occurring in the eastern Great Basin (type locality Fort Douglas, Utah) was not recognized. Tanner and Jorgensen (1963) reaffirmed the clines noted previously by other authors in the dorsal rows and ventrals.

Remarks—This is one of the most common colubrid snakes in many portions of the Great Basin. A fact amply demonstrated not only by noting the number of individuals of this snake killed on the various paved highways which traverse the region, but also by the large number of preserved specimens in research collections. Many of the records are from or near cultivated areas, which suggest that this form has enjoyed some success in adapting to the revolutionary ecological situations created by man, populations may be drawn into such areas because of the increased rodent (food) supply which normally occurs in cultivated areas.

Genus *Lampropeltis* Fitzinger

Lampropeltis pyromelana infralabialis W. Tanner

Material Examined—Nev.: W. P. Co., Saw Mill Cn. (U. of U. 2814A).

Utah: Beaver Co., Beaver (B.Y.U. 10340, 11287-8). Piute Co., Antimony (B.Y.U. 8643). Sevier Co., Annabelle (B.Y.U. 11111). Wasatch Co., Wallsburg (B.Y.U. 322).

Variation—Some aspects of the variation of this seemingly rare snake were provided by Tanner (1953). Ventral scales in the above samples are higher in females than males [♂ 4 (226.5) 213-230; ♀ 3 (221) 216-224]. There does not seem to be a comparable degree of sexual dimorphism in subcaudals [♂ 2 (69) 67-71; ♀ 3 (69.66) 68-71]. Sexual differences in the number of body spots are not too conspicuous [♂ 4 (46) 40-49; ♀ 3 (44.33) 39-50].

Remarks—Present records indicate that this beautiful snake is limited to the eastern Great Basin. It was probably derived from progenitors in the Mexican Plateau. It seems to be quite hydrophilic not extending in the more xeric portions within its range, but restricted to montane island populations where such areas are surrounded by xeric environments.

Lampropeltis getulus californiae Blainville

Material Examined—Calif: Inyo Co., Independence (B.Y.U. 18965).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17398, 17946, 21758, 23614).

Variation—The specimen from Independence was so badly smashed that but few characters could be discerned. Selected data

for the Nevada specimens are: ventrals 4 (247.33) 236-253; subcaudals 3 (55) 53-59; snout vent length 3 (739.66) 401-975. All specimens seen are of the banded color pattern and resemble closely those seen from the Colorado River drainage in southwestern Utah.

Lampropeltis doliata utahensis W. Tanner and Loomis

Material Examined—Utah: Garfield Co., near Panguitch (B.Y.U. 8923). Juab Co., 8 mi S Eureka (U. of U. 3018). S. L. Co., Near Lark (U. of U. 1413), Butterfield Cn. (U. of U. 1430). Sanpete Co., S edge of Ephraim (B.Y.U. 11117), Mt. Pleasant (B.Y.U. 2929), Moroni (U. of U. 90). Tooele Co., Tooele V. (B.Y.U. 334), Benmore (B.Y.U. 8922), Tooele (U. of U. 317, 426). Utah Co., 2 mi N Alpine (B.Y.U. 10533), 3 mi E Thistle (B.Y.U. 337-8, 1505), Provo (B.Y.U. 333), Cedar V. (B.Y.U. 2930), Payson (B.Y.U. 6023), foothills N Lehi (B.Y.U. 2718), Alpine (B.Y.U. 2756, 14382), Spanish Fk. (B.Y.U. 336), Hobble Cr. Cn. (B.Y.U. 520, 2924, 12415), Springville (B.Y.U. 11249, 23167), Cabins West Cn. (B.Y.U. 13776-7), Rock Cn. (B.Y.U. 11100), mouth of Pole Cn. near Cedar Ft. (U. of U. 1963). Wasatch Co., Wallsburg (U. of U. 318).

Variation—Few additional specimens are available since the description of *L. d. taylori*. It is therefore suggested that variations listed by Tanner and Loomis (1957) be considered.

Remarks—The habits and habitats of this subspecies are not well known. Most specimens were collected by amateur or interested laymen and given to the universities at a later date.

Many specimens are brought to the universities dead, most of them having been killed by the collectors. When asked why the specimen was killed one of two answers is given: Isn't it a poisonous coral snake? Or, the snake bites. Most individuals bite, even young ones; however, they are neither poisonous nor a coral snake. In the Great Basin of Utah, snakes having an appearance of coral snakes are king snakes.

Genus *Rhinocheilus* Baird and Girard

Rhinocheilus lecontei lecontei Baird and Girard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17399, 17945, 18761, 21756-7, 23635).

Utah: Tooele Co., Dugway PG (B.Y.U. 14799-14800). Juab Co., 10 mi SE Callao (B.Y.U. 2965, 11294). Millard Co., Fillmore (B.Y.U. 2931), White V. (B.Y.U. 1162, 2863).

Variation—There is little variation in the small series from southern Nevada and western Utah. Males average a few more ventrals [♂ 6 (203.8), ♀ 4 (200.5)] and caudals [♂ 5 (52.2), ♀ 5 (49.0)] than the females. Other scale patterns are uniform.

For a discussion of the variation in the color pattern the study of Tanner and Jorgensen (1963:24) includes the same material examined above and expresses our views adequately.

Remarks—The occurrence of *Rhinocheilus* in the Bonneville Basin of eastern Nevada and western Utah is of more than passing interest. Such species as *Crotalus cerastes*, *Crotalus mitchelli*, *Tantilla utahensis*, *Trimorphodon lambda*, *Lampropeltis getulus*, *Arizona elegans*, *Salvidora hexalepis*, *Masticophis flagellum*, *Sceloporus magister*, *Sauromalus obesus* and *Coleonyx variegatus* inhabit the same general habitat as does *Rhinocheilus* in Washington County, Utah, and in southern Nevada. In spite of this, *R. lecontei* is the only species of this presumably Lower Sonoran group to invade the Bonneville Basin. All specimens thus far taken in western Utah have come from the western valleys, strongly suggesting that it has extended its range since the last Pluvial Period.

Genus *Sonora* Baird and Girard

Sonora semiannulata isozona Cope

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17386, 17919, 17930, 18734-5, 18757), E Lathrop Wells (B.Y.U. 23683-4).

Variation—All of the above specimens are males except for one female. One specimen has a striped pattern with the four middorsal rows reddish-orange grading laterally into gray. All others are of the usual bicolored phase.

Sizes in terms of snout-vent length ranged from 209 to 295 mm. with a mean of 251.4. Ventral plates in the males ranged from 161-168 with a mean of 165. Caudals ranged in number from 56-61 with a mean of 57.

Remarks—Considerably more collecting must be done in the Great Basin before we will understand the distribution of this species. Its occurrence in the Snake River Valley below Boise, Idaho, suggests that its distribution extends throughout the Great Basin; however, the Idaho population appears to be isolated with no known populations in western Utah or in central and northeastern Nevada. Other than the Nye County records Banta (1965) lists this species as occurring in Humboldt, Pershing and Washoe Counties all in the western (Lahontan) basin. Indications are that *Sonora* reached the Snake River Valley through the western part of the Great Basin in Nevada, southern Oregon and then into Idaho. Proper collecting methods (can traps, etc.) at the appropriate seasons may yet connect these disjunct populations.

Genus *Chionactis* Cope

Chionactis occipitalis talpina Klauber

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17369-85, 17919, 18741-54); Jackass Flats (B.Y.U. 23631); Lathrop Wells (B.Y.U. 23685-88).

VARIATION—The variations occurring in this subspecies are summarized for Nye County by Tanner and Jorgensen (1963) and for adjoining California by Elvin (1963). The averages for the ventrals and caudals for the specimens listed above are ♂ 151.3, ♀ 161.0 and ♂ 45.3, ♀ 44.8 respectively.

REMARKS—Variations in the ranges of the ventrals and caudals (♂ 18, 148-155, ♀ 14, 155-166; ♂ 18, 41-49, ♀ 13, 43-47) overlap these scale patterns in *o. occipitalis*. We therefore designate *o. talpina* as a subspecies on the color pattern (presence of secondary bands) and not for any distinctness in the scale pattern.

Genus *Hypsiglena* Cope

Hypsiglena torquata deserticola W. Tanner

MATERIAL EXAMINED—NEV.: Humboldt Co., 28 mi E Winnemucca (B.Y.U. 2912). Nye Co., Mercury NTS (18727), W Lathrop Wells (B.Y.U. 23681).

UTAH: Tooele Co., Dugway PG (B.Y.U. 14795). S. L. Co., gravel pits NE S. L. City (U. of U. 1402-7, 1416). Utah Co., 2 mi N Alpine (B.Y.U. 6924, 11248, 11306, 11310, 11401), Bonneville Terrace, Provo (B.Y.U. 3014, 7938, 8011), Chimney Rock Pass (B.Y.U. 2836, 2196-8, 15008-9), 5 mi W Lehi (B.Y.U. 640), Rock Cn., Provo (B.Y.U. 15010, 16253), Meseda Bench (B.Y.U. 2026-8, 2045, 2709, 3960, 7020, 7937, 14698, 23327), Provo (22209). Juab Co., Topaz Mtn. (U. of U. 9068). Sanpete Co., 2 mi NE Ephraim (B.Y.U. 14694-5). Beaver Co., 3 mi N Minersville (B.Y.U. 23550).

VARIATION—Variations in the ventrals [♂ 14 (182.2); ♀ 16 (190.3)] and caudals [♂ 11 (57.5); ♀ 16 (50.1)] are similar to the variations listed by Tanner (1946) for the entire subspecies. The dorsal rows rarely vary from the 21 rows at midbody; however, before the vent 15, 16 or 17 rows may occur. Most specimens having 16 or 17 rows are females with rarely a male failing to reduce to 15 rows. Females are about equally divided between those having 16 or 17 rows and those with 15.

REMARKS—Night snakes are one of the commonest snakes in lower foothill habitats of the Great Basin. In the few areas where intensive collecting has been done this species has provided as many specimens as have other common species. Their habit of moving at night and hiding under rocks in the day has led to the conclusion that the species is rare, an illusion held by the senior author until this snake was intensively studied.

A study now in press (Tanner, 1966) will discuss in part the distribution of this species in the southern Great Basin. We apply the same general thesis that *Hypsiglena* has extended its range considerably since the last major Pluvial Period, and particularly in the northern parts of the Great Basin (principally Lahonton and Bonneville basins).

Genus *Trimorphodon* Cope

Trimorphodon lyrophanes Cope

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17939, 23727).

Variation—The above specimens are males with total lengths of 408 and 502. Tail lengths are 61 and 88 respectively. Both have 221 ventral plates and 75, 77 caudals. Body and tail blotches number 29, 16 and 32, 18 respectively.

Remarks—Collecting records would indicate a small population in the Great Basin of southern Nevada; however, little is known about the specific habits and habitats of this species.

Genus *Tantilla* Baird and Girard

Tantilla planiceps utahensis Blanchard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17922-3).

Variations and remarks concerning these specimens and others from many localities in southwestern United States and northwestern Mexico are provided in the recent study by Tanner (1966).

Family Crotalidae

Genus *Crotalus* Linnaeus

Crotalus cerastes cerastes Hallowell

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17387-9, 18780-5, 21857, 22207); 29 mi S Goldfield (B.Y.U. 18786). California: Inyo Co., Shoshone, Death Valley (B.Y.U. 20975).

Variation—There is a noticeable sexual dimorphism in both the ventrals [6 ♀ (145.2) 143-146; 9 ♂ (139.7) 138-142] and caudals [6 ♀ (17.7) 16-19; 9 ♂ (22.9) 21-25]. Other variations occur in the labials with both the upper and lower series ranging from 12 to 16 scales, but with most counts 13, 14 or 15 scales.

The color pattern is remarkably uniform. The only variation noted is a slight change in the ground color.

Remarks—The horned rattlesnake occurs in the desert valleys and the adjacent foothills in south and western Nevada. Its present distribution indicates a post-pluvial extension of its range into these more northern valleys. As yet its range does not include areas where *Artemisia tridentata* is the dominant shrub.

Crotalus mitchelli stephensi Klauber

Material Examined—Nev.: Nye Co., NTS Mercury (B.Y.U. 17390-1, 17950-1, 17921, 18772-9, 18970).

Variation—Fifteen specimens (4 females and 11 males) show little variation in the ventrals which average 175.9 and 175.75 re-

spectively. Caudals show sexual dimorphism (♀ 19.0 and ♂ 26.6) and the scale rows are approximately equally distributed between 23 and 25 rows at midbody. There is considerable variation in the labials with both the upper and lower series ranging from 12-16 scales. Most specimens show individual variation with some varying as much as three scales (12-15 or 13-16); however, most vary only a scale or two and are more commonly 13, 14 or 15 scales.

The ground color may vary from a slate grayish to a decided pinkish with the spots taking on shades of brown which compliment and blend with the basic color.

Remarks—We have designated the subspecies occurring in Nye County, Nevada, as *stephensi*. In this species, as in several others (*Arizona elegans*, *Chionactis occipitalis*, *Coleonyx variegatus*) intergradation appears to occur in the adjoining areas to the east. Although most subspecies do not respect the boundaries of the Great Basin, a few seem not to intergrade at or near its boundary in western Clark County.

Crotalus viridis lutosus Klauber

Material Examined—Ida.: Franklin Co., Clifton (B.Y.U. 339).

Nev.: Lander Co., Battle Mtn. (U. of U. 1058). Nye Co., Lockes (B.Y.U. 18966), Troy Cn., 35 mi SW Currant (B.Y.U. 14645). White Pine Co., Cherry Cr. (U. of U. 807a).

Utah: Beaver Co., Minersville (B.Y.U. 355). Box Elder Co., Locomotive Spr. (U. of U. 874-5, 907-921, 924), 6 mi W, 12 N Corrine (U. of U. 3249), Lucin (B.Y.U. 13017). Cache Co., Hills W Logan (B.Y.U. 8276-8). Wellsville Cn. (B.Y.U. 340, 1284). Garfield Co., Bryce Cn., Natl. Park (U. of U. 350). Juab Co., Topaz Mtn. (B.Y.U. 9070), Nephi (U. of U. 115A), Fish Spr. (U. of U. 2237). Millard Co., Desert Range Exper. Sta. (B.Y.U. 14692, U. of U. 2807). Morgan Co., E Como Spr. (U. of U. 1207-9, 2223-2231). S. L. Co., (U. of U. 2854). Emigration Cn. (U. of U. 3342, 1273), 5 mi NE Draper (U. of U. -), nr. Warm Spr. (U. of U. 1303), S. L. City (U. of U. 1674, 3342), Ft. Douglas (U. of U 1674). Sanpete Co., 5 mi S Mayfield (B.Y.U. 16804), 3 mi N Fountain Green (B.Y.U. 669). Maple Cn. (U. of U 680), Mt. Pleasant (U. of U. 112). Ephraim (U. of U. 5-6). Summit Co., 1½ mi NE Coalville (U. of U. 2105-2107, 2195-2209, 2217-2222, 2408). Tooele Co., 15 mi N Ibapah (B.Y.U. 354, 1301, 1381), Ibapah (U. of U. 2236), 3 mi SE Stockton (U. of U. 2144), nr. Stockton (U. of U. 2829), Lowe (U. of U. 1971-7, 1989-95), 4 mi W Grantsville (U. of U. 1432-4, 1979, 2202, 2494, 2638-41), Rush V. (U. of U. 1058-9), Lowe (U. of U. 1971-8, 1989-90), Tooele (U. of U. 288), Clover (U. of U. 1060). Utah Co., Chimney Rock Pass (B.Y.U. 2841, 15016), Nunns, Provo Cn. (B.Y.U. 18248), Rock Cn. (B.Y.U. 9059), Provo Cn. (B.Y.U. 346, 1289), 4 mi W Lehi (B.Y.U. 584, 1821, 2706, 2029-30), "Y" Mtn. E Provo (B.Y.U. 356, 1302, 8741), Spanish Fk. Cn. (B.Y.U. 8742), West Mtns. (B.Y.U. 6942), W side, Cedar V. (B.Y.U. 2845, 2212), S Fk. West Cn. (B.Y.U. 14674-5), Lehi (B.Y.U. 370, 1315), Payson (U. of U.

696), 2 mi S Cedar Ft. (U. of U. 1294-1298, 2479-81), Cedar V. (U. of U. 3117), mth. Spanish Fk. Cn. (U. of U. 2853). Washington Co., Enterprise (B.Y.U. 359). Weber Co., Ogden (U. of U. 2892).

Variation—Sexual dimorphism is moderately developed; however, there is an overlapping of the ranges of variation in the ventrals and caudals so that sex in all specimens cannot be determined by scale counts alone. The ranges of variation and averages are as follows: ventrals, ♂ 65 (177.66) 170-188; ♀ 70 (182.98) 175-191; caudals, ♂ 66 (25.5) 21-32; ♀ 69 (21-55) 18-26. Males are longer than females. An average of fifteen of the largest specimens of each sex indicates the approximate differences in total length: ♂ (952.5) 826-1031; ♀ (855.6) 713-952. Other variations occur in the dorsal rows before the vent, with 19 usually occurring, but occasionally with 21 rows. The labials are variable with both the upper and lower labials ranging from 14 to 17 with 15 the more common number.

Remarks—The Great Basin rattlesnake is perhaps the most widely distributed species in the area. Specimens have been recorded from the low valleys and up to elevations of 9,000 feet. They occur in low brush and also in the oak-aspen habitats at higher elevations.

Throughout the northern part of the Great Basin this species can usually be found in rocky areas in the spring and fall as they emerge or move toward the denning areas. In the summer the valleys serve as feeding grounds for most of the population denning in the surrounding foothills. It is not uncommon for rattlesnakes to move into orchards or other irrigated areas during the summer.

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